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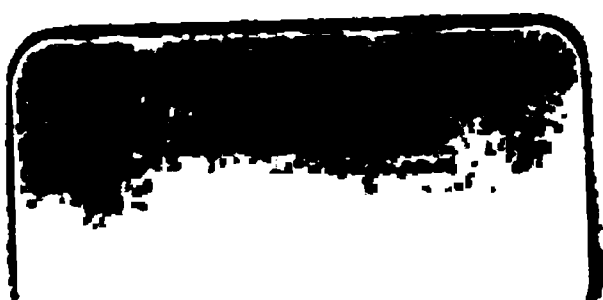
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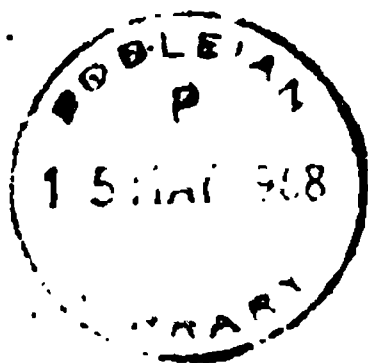
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A N A T O M Y.

INTRODUCTION.

SECT. I. ETYMOLOGY, DEFINITION, and DIVISIONS of ANATOMY.

(1.) **ANATOMY**, [*anatomic*, Fr. *anatomia*, Lat. from *anatomē*, of *anatomein*, Gr. to cut atunder,] literally signifies dissection or separation of parts. As an **ART**, therefore, anatomy means simply the operation of dissecting or artificially separating the parts of an animal body; but as a **SCIENCE**, it comprehends all the objects of such dissection; which, in general, are, to discover the various *situations, figures, connections, powers and uses* of the parts, with the *structure, fabric, and economy* of the whole.

(2.) This most important science is usually divided into **ANATOMY** properly so called, or as some authors justly stile it **HUMAN ANATOMY**, and **COMPARATIVE ANATOMY**. The former of these is usually applied to the examination of the *structure and parts* of the human body: the latter to that of the brute creation alone.

(3.) **ANATOMY** has also been divided into **SPECULATIVE** and **PRACTICAL**, a division of little moment; as well as into **PHYSICAL**, comprehending that which has for its object the description of the several parts, and **MEDICINAL**, meaning that which, along with the former, comprehends also their offices, uses, and concern in preserving health, or being subject to disease.

SECT. II. HISTORY OF ANATOMY.

(4.) This science is generally believed to be very ancient; although many ages have passed before it was brought to any degree of perfection. It is natural to think, indeed, that there must have been some knowledge of it very early in the world, in the slaughter of beasts for the use of men, as well as for sacrifices; the accidents of war, and attention to the recovery of the wounded; the various methods of putting criminals to death; murders and the numerous casualties to which the human body is subject, &c. together with the curiosity natural to mankind in all ages, could not fail to furnish some general knowledge of the *structure of the human body* at a very early period.

VOL. II. PART, I.

61. But it is extremely difficult, impossible to fix the period, when anatomy was first to be studied as a science.

(5.) **MANETHO**, an ancient Egyptian, according to the report of Eusebius, **ATHORIS**, a king of Egypt, wrote on anatomy. This king, according to the Egyptian chronology of the Egyptian ages before Adam. But although anachronism as false, we may admit of the fact, that the Egyptian monarchs made some advances in the study of anatomy. It is frequently, that the science had been so long to attract the attention even of royalty, that it has been inferred from some passages in the Bible, that **SOLOMON** was not ignorant of the anatomy of the human body.

(6.) Be that as it may, it is certain that the study of anatomy had made some progress in Greece before the days of Homer. It appears, from various passages in his poems, to have had a tolerable knowledge of the different parts of the human body. It has been well versed in the *enunciation* (as he expresses it) of wounds; as he gives a particular account of their effects in almost every part of the body.

(7.) What discoveries in the anatomy of the human body were made by **ÆSCULAPIUS**, who lived before Homer, neither history nor tradition records. But it is at least highly probable that the great fame he had acquired as a physician, and which led the Greeks to deify and worship him, was owing to his proficiency in anatomy, as well as in other branches of the healing art. His sons **MACHAON** and **PODALIRIUS** succeeded him and followed him in the medical profession. From them the secrets of the medical art would be communicated to others. It is no doubt fresh discoveries made in the days of Homer, when it had arrived at a high degree of improvement, in which we find the passages above alluded to.

(8.) Still, however, neither anatomy nor medicine had attained to such a degree of perfection.

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ment as to entitle them to be classed as Sciences; for till the age of Hippocrates, we find physic in general only ranked as a branch of philosophy among the Greeks. In the other eastern countries the climate, as well as their peculiar customs and superstitions, appear to have been as unfavourable to practical anatomy as they were inviting to the study of astronomy, geometry, poetry and the other arts of peace. Animal bodies in these countries run so quickly into nauseous putrefaction, that the early inhabitants must have avoided such offensive employments as anatomical inquiries, like their posterity at this day.

(9.) In fact it does not appear, by the writings of the Grecians, Jews, or Phœnicians, or of other eastern countries, that anatomy was particularly cultivated by any of those eastern nations. In tracing it backwards to its infancy, we cannot go farther into antiquity than the times of the Grecian philosophers. As an art in a state of some cultivation, it may be said to have been brought forth and bred up among them as a branch of natural knowledge. The æra of philosophy, as it was called, began with Thales the Milesian, about A. A. C. 480. The philosophers of his school, which was called the Ionian, cultivated principally natural knowledge.

(10.) Socrates, the 7th in succession of their great teachers, introduced the study of morals, and was thence said to bring down philosophy from heaven, to make men truly wise and happy. In the writings of his scholar and successor Plato, we find that the philosophers had carefully considered the human body, both in its organization and functions; and though they had not arrived at the knowledge of the more minute and intricate parts, which required the successive labour and attention of many ages, they had acquired very comprehensive ideas of the subject in general.

(11.) The anatomical descriptions of Xenophon and Plato have been quoted by Longinus (§ xxxii.) as specimens of sublime writing; and the extract from PLATO is still more remarkable, for its containing the rudiments of the circulation of the blood. "The heart, (says Plato,) is the centre or knot of the blood-vessels; the spring or fountain of the blood, which is carried impetuously round; the blood is the *pabulum* or food of the flesh; and for the purpose of nourishment, the body is laid out into canals, like those which are drawn through gardens, that the blood may be conveyed, as from a fountain, to every part of the pervious body."

(12.) The famous HIPPOCRATES was nearly contemporary with these eminent philosophers, about A. A. C. 400. He is said to have separated the profession of philosophy and physic, and to have been the first who applied to physic alone as the business of his life. He is likewise generally believed to be the first who wrote upon anatomy; and the first anatomical dissection which has been recorded, was made by his friend DEMOCRITUS of Abdera. If, however, we read the works of Hippocrates with impartiality, and apply his account of the parts to what we know of the human body, we must allow his descriptions to be imperfect, incorrect, sometimes extravagant, and often unintelligible, that, of the bones only excepted.

He seems to have studied these with more success than the other parts, and tells us that he had an opportunity of seeing a human skeleton. Pausanias relates, that Hippocrates, to perpetuate the memory of his discoveries in anatomy, consecrated a brazen skeleton to the Delphian Apollo.

(13.) During the period that elapsed between Hippocrates and GALEN, who flourished towards the end of the second century, in the decline of the Roman empire, that is, in the space of 600 years, anatomy was greatly improved; the philosophers still considering it as a most curious and interesting branch of natural knowledge, and the physicians as a principal foundation of their art. Both of them, in that interval of time, contributed daily to the common stock, by more accurate and extended observations, and by the lights of improving philosophy. As both Hippocrates and Galen had applied very particularly to the study of animal bodies, they not only made great improvements, especially in physiology, but raised the credit of natural knowledge, and spread it as wide as Alexander's empire.

(14.) From an illiberal idea entertained by ARISTOTLE, few of that philosopher's writings were made public in his lifetime. He affected to say that they would be unintelligible to those who had not heard them explained at his lectures: And, except the use which THEOPHRASTUS made of them, they were lost to the public for above 130 years after the death of Theophrastus; and at last came out defective from bad preservation, and corrupted by men, who, without proper qualifications, presumed to correct and to supply what was lost. From the time of Theophrastus, the study of natural knowledge at Athens was on the decline; and the reputation of the Lyceum and Academy was almost confined to the studies which are subservient to oratory.

(15.) Alexandria in Egypt was the scene of the other great institution for Grecian education. The first Ptolemies, both from their love of literature, and to give true and permanent dignity to their empire, and to Alexander's favourite city, set up a grand school in the palace itself, with a museum and a library, which, we may say, has been the most famed in the world. Anatomy, among other sciences, was publicly taught; and the two distinguished anatomists were ERASISTRATUS the pupil and friend of Theophrastus, and HEROPHILUS. Their voluminous works were all lost, by the burning of that famous library; but they are quoted by Galen almost in every page. These professors were probably the first who were authorised to dissect human bodies: a peculiarity which marks strongly the philosophical magnanimity of the first Ptolemy, and fixes a great æra in the history of anatomy. And it was, no doubt, from this particular advantage which the Alexandrians had above all others, that their school not only gained, but for many centuries preserved, the first reputation for medical education. Ammianus Marcellinus, who lived about 650 years after the schools were set up, says, they were so famous in his time, that it was enough to secure credit to any physician, if he could say he had studied at Alexandria. Herophilus has been said to have anatomized 700 bodies. The num-

let is doubtless exaggerated. Nay, it was said, that both he and Erasistratus made it a common practice to open living bodies, that they might discover the more secret springs of life. But this, no doubt, was only a vulgar opinion, rising from the prejudices of mankind; and accordingly, without any good reason, such tales have been told of modern anatomists, and have been believed by the vulgar.

16.) Though it is probable the Romans had physicians and surgeons from the foundation of the city, yet we have no account of any of these applying themselves to anatomy for a very long time. Archagathus was the first Greek physician established in Rome, and he was banished on account of the severity of his operations.—ASCLEPIADES, who flourished in Rome 101 years after ARCHAGATHUS, in the time of Pompey attained such a high reputation as to be ranked in the line of Hippocrates. He seemed to have had some notion of the air in respiration acting by its weight; and in accounting for digestion, he supposed the food to be no farther changed, than by a comminution into extremely small parts, which, being distributed to the several parts of the body, is assimilated to the nature of each. Cassius, commonly thought to be a disciple of Asclepiades, accounted for the right side of the body becoming paralytic on hurting the left side of the brain, in the same manner as has been done by the moderns, viz. from the crossing of the nerves from the right to the left side of the brain. From the time of Asclepiades to the second century, physicians seem to have been greatly encouraged at Rome; and in the writings of CELSUS, RUFUS, PLINY, COELIUS AURELIANUS, and ARETÆUS, we find several anatomical observations, but mostly very superficial and inaccurate.

17.) The celebrated GALEN, whose name is so well known in the medical world, flourished about the end of the 2d century. He applied himself particularly to the study of anatomy, and did more in that branch than all that had gone before him. He seems, however, to have been at a great loss for human subjects to operate upon; and therefore his descriptions of the parts are mostly taken from brutes. His works contain the fullest history of anatomy, and the most complete system of the science, to be met with anywhere before him, or for several centuries after: so that a number of passages in them were long absolutely unintelligible for many ages, and explained by the discoveries of succeeding anatomists.

18.) Towards the end of the 4th century, NICOLAUS bishop of Emessa wrote a treatise on the structure of man, in which it is said were contained 140 celebrated modern discoveries; the one, the structure of the bile, boasted of by Sylvius de la Boe; and the other, the circulation of the blood. This last, however, is proved by Dr Friend, in his History of Physic, p. 229, to be falsely ascribed to the author.

19.) When the Roman empire began to be oppressed by the barbarians, and sunk in gross superstition, learning of all kinds decreased; and when the empire was totally overwhelmed by these barbarous nations, every appearance of science was almost extinguished in Europe. The

only remains of it were among the Arabians in Spain and in Asia.—The Saracens, who came into Spain, destroyed at first all the Greek books which the Vandals had spared: But though their government was in a constant struggle and fluctuation during 800 years before they were driven out, they received a taste for learning from their countrymen of the east; several of their princes encouraged liberal studies; public schools were set up at Cordova, Toledo, and other towns, and translations of the Greeks into the Arabic language were universally taught and read. Thus was the learning of the Grecians transferred to the Arabians. But though they had so good a foundation to build upon, this art was never improved while they were masters of the world: For they were satisfied with commenting upon Galen; and seem to have made no dissections of human bodies.

(20.) About the end of the 12th, and beginning of the 13th century, flourished ABDOLLALIPH, who was a teacher of anatomy, a man eminent in his time for learning and curiosity; a great traveller, who had been bred at Bagdad, and had seen many of the great cities and principal places for study in the Saracen empire. But although he had a favourable opinion of original observation, in opposition to book-learning; and boldly corrected some of Galen's errors, and was persuaded that many more might be detected, yet even this man never made or saw, or seemed to think of a human dissection. He discovered Galen's errors in the osteology, by going to burying grounds, with his students and others, where he examined and demonstrated the bones; he earnestly recommended that method of study, in preference even to the reading of Galen, and thought that many farther improvements might be made; yet he seemed not to have an idea that a fresh subject might be dissected with that view. Probably the Jewish tenets, which the Mahometans adopted about uncleanness and pollution, might prevent their handling dead bodies; or their opinion of what was supposed to pass between an angel and the dead person, might make them think disturbing the dead highly sacrilegious.

(21.) Such, however, as Arabian learning was, for many ages together, there was hardly any other in all the western countries of Europe. It was introduced by the establishment of the Saracens in Spain in 711, and kept its ground till the restoration of learning in the end of the 15th century. The state of anatomy in Europe, in the times of Arabian influence, may be seen by reading a very short system of anatomy drawn up by MUNDINUS, in 1315. It was extracted principally from what the Arabians had preserved of Galen's doctrine; and, rude as it is, in that age, it was judged to be so masterly a performance, that it was ordered, by a public decree, to be read in all the schools of Italy; and it actually continued to be almost the only book which was read upon the subject for above 200 years. Cortesius gives him the credit of being the great restorer of anatomy, and the first who dissected human bodies among the moderns.

(22.) The prejudices against dissection, however, almost universally prevailed till the 16th century.

very serviceable by imposing *names* on the muscles, most of which are retained to this day. Formerly they were distinguished by *numbers*, which were differently applied by almost every author.

(30.) In 1561, Gabriel Fallopius professor of anatomy at Padua, published a treatise of anatomy under the title of *Observationes Anatomicae*. This was designed as a supplement to Vesalius; many of whose descriptions he corrects, though he always makes mention of him in an honorable manner. Fallopius made many great discoveries, and his book is well worth the perusal of every anatomist. In 1563, BARTHOLOMÆUS published his *Opuscula Anatomica* at Venice, which have ever since been justly admired for the exactness of the descriptions, and the discoveries contained in them. He published afterwards some other pieces, in which there is little of anatomy; but never published the great work he had promised, which was to be adorned with copperplates representing all the parts of the human body. These plates, after lying buried in an old cabinet for upwards of 150 years, were at last discovered and published in the year 1714, by Lancini the pope's physician; who added a short explanatory text, because Eustachius's own writing could not be found.

(31.) From this time the study of anatomy gradually diffused itself over Europe; insomuch that for the last hundred years it has been daily improving by the labour of a number of professional anatomists almost in every country of Europe. We may form a judgment of the state of anatomy even in Italy, in the beginning of the 17th century, from the information of CORTESIUS. He had been professor of anatomy at Bologna, and was then professor of medicine at Massana; where, though he had a great desire to improve himself in the art, and to finish a treatise which he had begun on practical anatomy, in 24 years he could twice only procure an opportunity of dissecting a human body, and then it was with difficulties and in hurry; whereas he had expected to have done so, he says, "once every year, according to the custom in the famous academies of Italy."

(32.) In the end of the 16th century, our great HARVEY, as was the custom of the times, went to Italy to study medicine; for Italy was still the favourite seat of the arts; And in the beginning of the 17th century, soon after Harvey's return to England, his master in anatomy, FABRICIUS AB AQUAPENDENTE, published an account of the valves in the veins, which he had discovered many years before, and no doubt taught in his lectures when Harvey attended them. This discovery evidently affected the established doctrine of all ages, that the veins carried the blood from the liver to all parts of the body for nourishment. It led Harvey to work upon the use of the heart and vascular systems in animals; and in the course of some years, he was so happy as to discover, and to prove beyond all possibility of doubt, the CIRCULATION OF THE BLOOD. He taught his new doctrine in his lectures about the year 1616, and printed it in 1628.

(33.) This was by far the most important step that has been made in the knowledge of animal bodies in any age. It not only reflected light upon what had been already found out in anat-

omy, but also pointed out the means of further investigation. And accordingly we see, that from Harvey to the present time, anatomy has been so much improved, that we may reasonably question, if the ancients have been further outdone by the moderns, in any other branch of knowledge. From one day to another there has been a constant succession of discoveries, relating either to the structure or functions of our body; and new anatomical processes, both of investigation and demonstration, have been daily invented. Many parts of the body, which were not known in Harvey's time, have since been brought to light: and of those which were known, the internal composition and functions remained unexplained; and indeed must have remained inexplicable without the knowledge of the circulation.

(34.) HARVEY's doctrine at first met with considerable opposition; but in the space of about 20 years it was so generally and so warmly embraced, that it was imagined every thing in physics would be explained. But time and experience have taught us, that we still are, and probably must long continue to be, very ignorant; and that in the study of the human body, and of its diseases, there will always be an extensive field for the exercise of sagacity.

(35.) The next question, after the discovery and knowledge of the circulation of the blood, would naturally have been about the passage and route of the nutritious part of the food or chyle, from the bowels to the blood vessels: And, by good fortune, in a few years after Harvey had made his discovery, ASELLIUS, an Italian physician, found out the lacteals, or vessels which carry the chyle from the intestines; and printed his account of them, with coloured prints, in the year 1627, the very year before Harvey's book came out.

(36.) For many years after these two publications, anatomists in all parts of Europe, were daily opening living dogs, either to see the lacteals, or to observe the phenomena of the circulation.—In making an experiment of this kind, PECQUET in France was fortunate enough to discover the thoracic duct, or common trunk of all the lacteals, which conveys the chyle into the subclavian vein. He printed his discovery in the year 1651. And now the lacteals having been traced from the intestines to the thoracic duct, and that duct having been traced to its termination in a blood vessel, the passage of the chyle was completely made out.

(37.) The same practice of opening living animals furnished occasion of discovering the lymphatic vessels. This good fortune fell first to the lot of RUDBECK, a young Swedish anatomist; and then to THOMAS BARTHOLINE, a Danish anatomist, who was the first who appeared in print upon the lymphatics. His book came out in 1653, two years after that of Pecquet. And then it appeared evident that they had been seen before by Dr HIGMORE and others, who had mistaken them for lacteals. But none of the anatomists of those times could make out the origin of the lymphatics, and none of the physiologists could give a satisfactory account of their use.

(38.) The circulation of the blood, and the pass-

passage of the chyle having been satisfactorily traced out in full grown animals, the anatomists were naturally led next to consider how these animal processes were carried on in the child while in the womb of the mother. Accordingly, the male and female organs, the appearances and contents of the pregnant uterus, the incubated egg, and every phenomenon which could illustrate generation, became the favourite subject for about 30 years with the principal anatomists of Europe. Thus it would appear to have been in theory: but Dr Hunter believes, that in fact, as Harvey's master Fabricius laid the foundation for the discovery of the circulation of the blood, by teaching him the valves of the veins, and thereby inviting him to consider that subject; so Fabricius, by his lectures, and by his elegant work *De Formato Fœtu, et de Formatione Ovi et Pulli*, probably made that likewise a favourite subject with Dr Harvey. But whether he took up the subject of generation in consequence of his discovery of the circulation, or was led to it by his honoured master Fabricius, he spent a great deal of his time in the inquiry; and published his observations in a book *De Generatione Animalium*, in 1651, that is, six years before his death.

(39.) SWAMMERDAM, VAN HORN, STENO, and DE GRAAF, within a few years after, excited great attention to the subject of generation, by their supposed discovery that the females of viviparous animals have ovaria, that is, clusters of eggs in their loins, like oviparous animals; which, when impregnated by the male, are conveyed into the uterus: so that, according to their doctrine, a child is produced from an egg as well as a chick; with this difference, that the one is hatched within, and the other without, the body of the mother.

(40.) Sometime after, MALPIGHI, a great Italian genius, made considerable advances upon the subject of generation. He was the first who used magnifying glasses with address in tracing the first appearances in the formation of animals. He likewise made many other observations and improvements in the *minutiæ* of anatomy by his microscopical labours, and by cultivating comparative anatomy.—This distinguished anatomist gave the first public specimen of his abilities by printing a dissertation on the lungs *anno* 1661; a period so remarkable for the study of nature, that it would be injustice to pass it without particular notice.—At the same time flourished LAURENTIUS BELLINUS at Florence, the first who introduced mathematical reasoning into physic. In 1662, SIMON PAULI published a treatise *De albandis ossibus*. He had long been admired for the white skeletons he prepared; and at last discovered his method, which was by exposing the bones to the weather, during winter.

(41.) JOHANNES SWAMMERDAM of Amsterdam also published some anatomical treatises; but was most remarkable for his art of preserving the parts of bodies entire for many years, by injecting their vessels. He also published a treatise on respiration; wherein he mentioned his having figures of all the parts of the body, as big as the life, cut in copper, which he designed to publish, with a complete system of anatomy. These, however,

were never made public by Swammerdam; but, in 1683, GOTHFRIDUS BIDLOO, professor of anatomy at Leyden, published a work intitled *Anatomia corporis humani*, wherein all the parts were delineated in very large plates almost as big as the life. Mr COWPER, an English surgeon, bought 300 copies of these figures; and in 1693, published them, with an English text, quite different from Bidloo's Latin one; to which were added letters in Bidloo's figures, and some few figures of Mr Cowper's own. To this work Cowper's name was prefixed, without the least mention of Bidloo, except on purpose to confute him. Bidloo immediately published a very ill-natured pamphlet, called *Gulielmus Cowperus citatus coram tribunali*; appealing to the Royal Society, how far Cowper ought to be punished as a plagiarist of the worst kind, and endeavouring to prove him an ignorant and deceitful fellow. Cowper answered him in his own style, in a pamphlet called his *Vindiciæ*; endeavouring to prove, either that Bidloo did not understand his own tables, or that they were none of his. It was even alledged that those were the tables promised by Swammerdam, and which Bidloo had got from his widow. This, however, appears to have been only an invidious surmise, there being unquestionable evidence that they were really the performance of Bidloo.

(42.) ISBRANDUS DIEMBROECK, professor of anatomy at Utrecht, soon after made his appearance as an anatomical author. His work contained very little original; but he was at great pains to collect from others whatever was valuable in their writings, and his system was the common standard among anatomical students for many years.

(43.) ANTONIUS LIEWENHOECK of Delft, about the same time, improved considerably on Malpighi's use of microscopes. These two authors took up anatomy where others had dropt it; and, by this new art, they brought a number of amazing things to light. They discovered the red globules of the blood; they were enabled to see the actual circulation of the blood in the transparent parts of living animals, and could measure the velocity of its motion; they discovered that the arteries and veins had no intermediate cells or spongy substance, as Harvey and all the preceding anatomists had supposed, but communicated one with the other by a continuation of the same tube. Liewenhoeck obtained great fame likewise for his discovery of the animalcula in the semen. Indeed there was scarcely a part of the body, solid or fluid, which escaped his examination; and he almost every where found, that what appeared to the naked eye to be rude undigested matter, was in reality a beautiful and regular composition.

(44.) Not long after this period, NUCK added to our knowledge of the absorbent system already mentioned, by his injections of the lymphatic glands; RUYSCH, by his description of the valves of the lymphatic vessels; and MECKEL, by his accurate account of the whole system, and by tracing those vessels in many parts where they had not before been described.

(45.) The attention of the public has also been particularly called to this part of anatomy, by Mr HUNTER and Dr MONRO, in their controversy concerning

They arose in Holland under Swammerdam and Ruyſch, and afterwards in England under Cowper, St André, and others, where they have been greatly improved.

(52.) The anatomists of former ages had no other knowledge of the blood-vessels, than what they were able to collect from laborious dissections, and from examining the smaller branches of them, upon some lucky occasion, when they were found more than commonly loaded with red blood. But filling the vascular system with a bright coloured wax, enables us to trace the large vessels with great ease, renders the smaller much more conspicuous, and makes thousands of the very minute ones visible, which from their delicacy, and the transparency of their natural contents, are otherwise imperceptible. The modern art of corroding the fleshy parts with a menstruum, and of leaving the moulded wax entire, is so exceedingly useful, and at the same time so ornamental, that it does great honour to the ingenious inventor, Dr NICHOLLS.

(53.) The representations in wax-work of the various parts of the human body, might deserve notice in a history of anatomy, if those who model these figures had not been so careless in their imitation. Many of the wax figures are so tawdry, with a show of unnatural colours, and so very incorrect in the circumstances of figure, situation, and the like, that though they strike a vulgar eye with admiration, they must appear ridiculous to an anatomist. But those figures which are cast in wax, plaster, or lead, from the real subject, and which of late years have been frequently made here, are, of course, very correct in all the principal parts, and may be considered as no insignificant acquisition to modern anatomy. The proper, or principal use of this art is, to preserve a perfect likeness of such subjects as we seldom can meet with, or cannot well preserve in a natural state; *e. g.* subjects in pregnancy, &c.

(54.) The improved methods of preserving animal bodies, or parts of them, has been of the greatest service to anatomy; especially in saving the time and labour of the anatomist in the nicer dissections of the small parts of the body. For now, whatever he has prepared with care, he can preserve; and the object is ready to be seen at any time. And in the same manner he can preserve anatomical curiosities, or rarities of every kind; such as, parts that are uncommonly formed; parts that are diseased; the parts of the pregnant uterus and its contents, &c. Large collections of such curiosities, which modern anatomists are striving almost everywhere to procure, are of infinite service to the art, especially in the hands of teachers. They give students clear ideas about many things which it is very essential to know, and which yet it is impossible that a teacher should be able to show otherwise, were he ever so well supplied with fresh subjects.

SECT. III. GENERAL VIEW of the SUBJECT.

(55.) ANATOMY, considered merely as a branch of philosophy, seldom fails to attract the curiosity of people of taste. The advice of the Grecian sage, *Know thyself*, will doubtless apply to the knowledge of our corporeal frame, as well as to that

of our intellectual. And if it is pleasing to be acquainted with the general structure of the body, it is certainly more so to discover all those springs which give life and motion to the machine, and to observe the admirable mechanism by which so many different functions are executed. Astronomy and anatomy, as Dr Hunter and Fontenelle have remarked, are studies which present us with the most striking view of the two greatest attributes of the Supreme Being. The first fills the mind with the idea of his immensity, in the magnitude, distances, and number of the heavenly bodies; the last, astonishes with his wisdom, in the variety, delicacy, and minuteness of animal mechanism.

(56.) The human body has been styled a microcosm, or little world; as if it did not differ so much from the universal system of nature in the symmetry and number of its parts as in their size. Galen's excellent treatise *De usu partium*, was composed as a prose hymn to the Creator; and abounds with as irresistible proofs of a supreme Cause and governing Providence, as we find in modern physico-theology. And Cicero dwells more on the structure and œconomy of animals than on all the productions of nature besides when he proves the existence of the gods from the order and beauty of the universe. It would be endless to quote the many animated passages on this subject which are to be found in the works of those physicians, philosophers, and theologians who have considered the structure and function of animals with a view towards the Creator. It is a view which must strike one with a most awful conviction. Who can know and consider the thousand evident proofs of the astonishing art of the Creator, in forming and sustaining an animal body such as ours, without feeling the most pleasant enthusiasm? Can we seriously reflect upon this awful subject, without being almost lost in adoration? without longing for another life after this in which we may be gratified with the highest enjoyment, which our faculties and nature seem capable of, seeing and comprehending the whole plan of the Creator, in forming the universe, and in directing all its operations?

(57.) Yet obvious as these reflections appear to be, they are far from striking *all* anatomists with equal force. It is said, that the great Galen owed his conversion from infidelity, or rather from *atheism*, to such serious reflections arising in his mind from viewing a human skeleton. On the other hand, some modern practitioners pretend to draw the very contrary inference; and because in their dissections of the human brain they can discover nothing but matter, presume to draw the absurd inference, not only that *matter* of itself, in a certain state of organization, is capable of *thinking*, without *spirit*, but also the impious conclusion, that *nothing else* exists in the universe! Similar false reasonings and absurd conclusions of medical practitioners in some former age, seem to have given rise to the illiberal adage *Ubi tres medici, ibi duo athei*;—a proverb, which a numerous list of respectable names, in our own age and country is sufficient to refute.

(58.) The more immediate purposes of anatomy, however, concern those who are to be the guardians

garden of health, as this study is necessary to lay a foundation for all the branches of medicine.

—The more we know of our fabric, the more reason we have to believe, that if our senses were more acute, and our judgment more enlarged, we should be able to trace many springs of life which are now hidden from us: by the same sagacity we should discover the true cause and nature of diseases; and thereby be enabled to restore the health of many, who are now, from our more confined knowledge, said to labour under incurable disorders. By such an intimate acquaintance with the œconomy of our bodies, we should discover even the seeds of diseases, and destroy them before they had taken root in the constitution.

(59.) That anatomy is the very basis of surgery every body allows. It is dissection alone that can teach us, where we may cut the living body with freedom and dispatch; and where we may venture with great circumspection and delicacy; and where we must not, upon any account, attempt it. This informs the *head*, gives dexterity to the *hand*, and familiarizes the *heart* with a sort of inhumanity, to the use of cutting instruments upon our fellow creatures. Besides the knowledge of our body, through all the variety of its *structure* and *operations* in a *sound* state, it is by anatomy only, that we can arrive at the knowledge of the true nature of most of the diseases which afflict humanity. The symptoms of many disorders are equivocal; and diseases themselves are thence frequently mistaken, even by sensible, experienced, and attentive physicians. But by anatomical examination after death, we can with certainty find out the mistake, and learn to avoid it in any similar case.

(60.) This use of anatomy has been so generally adopted by the moderns, that the cases already published are almost innumerable: MANGERUS, MAGAGNI, and many of the best modern writers in physic, are full of them. And if we look among the physicians of the best character, and among those who have the *art* itself, rather than the *name* of the profession at heart; we shall find them constantly requesting leave to examine, after death, the bodies of such patients as have died of an extraordinary or unaccountable disease. And certainly in all such cases, those surviving relations, who would refuse a physician this privilege, would show a great want of public spirit and philanthropy.

(61.) Having thus considered the rise and progress of anatomy; the various discoveries that have been made in it, from time to time; the great number of diligent observers who have applied themselves to this art; and the importance of this study, not only for the prevention and cure of diseases, but in furnishing the liveliest proofs of divine wisdom; the following questions seem naturally to arise: For what purpose is there such a variety of parts in the human body? Why such a complication of nice and tender machinery? Why was there not rather a more simple, less delicate, and less expensive frame?

(62.) The late ingenious Mr Hunter has answered all such questions, in a very satisfactory manner, in his introductory lecture on anatomy; where, after supposing that an *immaterial spirit* is a-

bout to be placed in a *corporeal* fabric, he commences an inquiry what will be necessary for her accommodation. “First, then,” says he “the *mind*, the thinking immaterial agent, must be provided with a place of immediate residence, which shall have all the requisites for the union of spirit and body; accordingly she is provided with the *brain*, where she dwells as governor and superintendant of the whole fabric. In the next place, as she is to hold a correspondence with all the material beings around her, she must be supplied with organs fitted to receive the different kinds of impressions which they will make. In fact, therefore, we see that she is provided with the organs of sense, as we call them: the eye is adapted to light; the ear to sound; the nose to smell; the mouth to taste; and the skin to touch.

(63.) “Farther: She must be furnished with organs of communication between herself in the brain and those organs of sense, to give her information of all the impressions that are made upon them: and she must have organs between herself in the brain and every other part of the body, fitted to convey her commands and influence over the whole. For these purposes the nerves are actually given. They are chords, which rise from the brain, the immediate residence of the *mind*, and disperse themselves in branches through all parts of the body. They convey all the different kinds of sensations to the mind, in the brain; and likewise carry out from thence all her commands or influence to the other parts of the body. They are intended to be occasional monitors against all such impressions as might endanger the well-being of the whole, or of any particular part; which vindicates the Creator of all things, in having actually subjected us to those many disagreeable and painful sensations, which we are exposed to from a thousand accidents in life. Moreover, the mind, in this corporeal system, must be endued with the power of moving from place to place, that she may have intercourse with a variety of objects; that she may fly from such as are disagreeable, dangerous, or hurtful, and pursue such as are pleasant or useful to her. And accordingly she is furnished with limbs, and with muscles and tendons, the instruments of motion, which are found in every part of the fabric where motion is necessary.

(64.) “But to support, to give firmness and shape in the fabric; to keep the softer parts in their proper places; to give fixed points for, and the proper direction to its motions, as well as to protect some of the more important and tender organs from external injuries; there must be some firm prop-work interwoven through the whole. And in fact, for such purposes the bones are given. The prop-work must not be made into one rigid fabric, for that would prevent motion.—Therefore there are a number of bones. These pieces must all be firmly bound together, to prevent their dislocation. And this end is perfectly well answered by the ligaments. The extremities of these bony pieces, where they move and rub upon one another, must have smooth and slippery surfaces for easy motion. This is most happily provided for, by the cartilages and mucus of the joints. The interstices of all these parts must

must be filled up with some soft and ductile matter, which shall keep them in their places, unite them, and at the same time allow them to move a little upon one another. And these purposes are answered by the cellular membrane or adipose substance. There must be an outward covering over the whole apparatus, both to give it compactness and to defend it from a thousand injuries; which, in fact, are the very purposes of the skin and other integuments.

(65.) "Lastly, the mind being formed for society and intercourse with beings of her own kind, she must be endued with powers of expressing and communicating her thoughts by some sensible marks or signs; which shall be both easy to herself, and admit of great variety: and accordingly she is provided with the organs and faculty of speech, by which she can throw out signs with amazing facility, and vary them without end.

(66.) "Thus we have built up an animal body, which would seem to be pretty complete: but as it is the nature of matter to be altered and worked upon by matter; so in a very little time such a living creature must be destroyed, if there is no provision for repairing the injuries which she must commit upon herself, and those which she must be exposed to from without. Therefore a treasure of blood is actually provided in the heart and vascular system, full of nutritious and healing particles, fluid enough to penetrate into the minutest parts of the animal; impelled by the heart, and conveyed by the arteries, it washes every part, builds up what was broken down, and sweeps away the old and useless materials. Hence we see the necessity or advantage of the heart and arterial system. What more there is of this blood than enough, to repair the present damages of the machine, must not be lost, but should be returned again to the heart; and for this purpose the venous system is actually provided. These requisites in the animal explain, *a priori*, the circulation of the blood.

(67.) "The old materials which were become useless, and are swept off by the current of blood, must be separated and thrown out of the system. Therefore glands, the organs of secretion, are given for straining whatever is redundant, vapid or noxious from the mass of blood; and when strained, they are thrown out by emunctories, called organs of excretion. But now, as the machine must be constantly wearing, the reparation must be carried on without intermission, and the strainers must always be employed. Therefore there is actually a perpetual circulation of the blood, and the secretions are always going on.

(68.) "Even all this provision, however, would not be sufficient; for that store of blood would soon be consumed, and the fabric would break down, if there were not a provision made for fresh supplies. These we observe, in fact, are profusely scattered round her in the animal and vegetable kingdoms; and she is furnished with hands the fittest instruments that could have been contrived, for gathering them, and for preparing them in a variety of ways for the mouth. But these supplies, which we call food, must be considerably changed; they must be converted into blood. Therefore she is provided with teeth for

cutting and bruising the food, and with a stomach for melting it down: In short, with all the organs subservient to digestion.—The finer parts of the aliments only can be useful in the constitution; these must be taken up and conveyed into the blood, and the dregs must be thrown off. With this view the intestinal canal is actually given. It separates the nutritious part, which we call *chyle*, to be conveyed into the blood by the system of absorbent vessels; and the feces pass downwards to be conducted out of the body.

(69.) "Now we have got our animal not only furnished with what is wanted for its immediate existence, but also with the powers of protracting that existence to an indefinite length of time. But its duration, we may presume, must necessarily be limited: for, as it is nourished, grows, and is raised up to its full strength and utmost perfection; so it must in time, in common with all material beings, begin to decay, and then hurry on to final ruin. Hence we see the necessity of a scheme for renovation. Accordingly with Providence, to perpetuate, as well as preserve his work, besides giving a strong appetite for life and self-preservation, has made animals male and female, and given them such organs and passions as will secure the propagation of the species to the end of time.

(70.) "Thus we see, that by the very imperfect survey which human reason is able to take of this subject, the animal must necessarily be complex in his corporeal system, and in its operations. He must have one great and general system, the vascular, branching through the whole for circulation: Another, the nervous, with its appendages the organs of sense, for every kind of feeling. And a third, for the union and connection of all those parts. Besides these primary and general systems, he requires others which may be more local or confined: One for strength, support, and protection; the bony compages: Another for the requisite motions of the parts among themselves as well as for moving from place to place; the muscular part of the body: Another to prepare nourishment for the daily recruit of the body, the digestive organs: and one for propagating the species; the organs of generation.

(71.) "In taking this general survey of what would appear, *a priori*, to be necessary for adapting an animal to the situations of life, we observe with great satisfaction, that man is accordingly furnished with such systems, and for such purposes. He has them all; and he has nothing more, except the organs of respiration. Breathing it seemed difficult to account for *a priori*: we only knew it to be in fact essentially necessary to life. Notwithstanding this, when we saw all the other parts of the body, and their functions, so well accounted for, and so wisely adapted to their several purposes, there could be no doubt that respiration was so likewise: And accordingly, the discoveries of Dr Priestley have lately thrown light upon this function also, as will be shown in its proper place.

(72.) "Of all the different systems in the human body, the use and necessity are not more apparent than the wisdom and contrivance which has been exerted, in putting them all into the most compact and convenient form: in disposing them so, that they

without the heart: if we set out with the heart and vascular system, we shall presently be sensible, that the brain and nerves must be supposed: or, should we take up the mouth, and follow the course of the aliment, we should see that the very first organ which presented itself, supposed the existence both of the heart and brain: Wherefore we shall incorporate the Physiology with the Anatomy, by attempting to explain the functions after we have demonstrated the organs.

SECT. V. EXPLANATION of the GENERAL TERMS of ANATOMY.

(81.) All the solid parts of the body, (which are the chief subjects of anatomy, properly so called,) have been arranged under general classes, expressed by the names of bones, cartilages, ligaments, fibres, membranes, arteries, veins, nerves, muscles, glands, &c. These terms it is proper to explain, before we enter more particularly upon the subject.

(82.) A BONE is that hard, solid, and most inflexible part of the body, which assists in forming the great frame-work of the human machine.—The bones having no nerves, are quite insensible.

(83.) A CARTILAGE is that whitish or pearl-coloured substance, which usually covers the extremities of a bone. Cartilages are softer than bone, but harder than any other part; smooth, pliable, and elastic.

(84.) A LIGAMENT is a white, fibrous, compact substance, more pliable than a cartilage, difficult to be broken or torn, and yielding but a very little when stretched. Bones, cartilages, and ligaments, will be described in their proper places.

(85.) FIBRES are those small and simple filaments, which, by their different dispositions and connections, compose all the other parts. Fibres are either membranous, fleshy, tendinous, or bony, and run in various directions, according to the nature of the parts they form.

(86.) A MEMBRANE is a pliable network of fibres interwoven in the same plane. Membranes differ in thickness, according to the smallness of their fibres, and number of their planes. These planes are termed *laminae*, and are distinguished according to their situation.

(87.) VESSELS are canals, more or less flexible, composed of different membranes, termed *coats*. Some of them divide into branches, more and more minute, but still remain hollow. The general design of the vessels is to convey fluids.—They are distinguished into blood vessels, lacteals, lymphatics, &c. The very last and smallest extremities of these are termed *capillaries*. Those vessels which receive the blood from the heart, and distribute it throughout the body, are named *arteries*; those which bring the blood back to the heart, are called *veins*.

(88.) ARTERIES may be distinguished from veins in a dead body, by their greater thickness, and by their diameter being preserved when divided, which is not the case with a vein.

(89.) NERVES are those white chords which proceed from the cerebrum, cerebellum, and spinal marrow, and are ramified over all the parts of the body.

The ABSORBENTS are a system of vessels,

whose office is to take up and convey away whatever comes in contact with their mouths or orifices. This system consists of the *lacteals* and *lymphatics*.

(91.) MUSCLES are masses of red fibres of various lengths. The middle portion of each muscle is said to be fleshy. The extremities are called *tendinous*, and those glistening, tough, inelastic insensible substances issuing from them, *tendons*.

(92.) GLANDS are clusters, composed of blood vessels and nerves, united together in different folds, contortions, and intertextures, and invested by a membranous covering. Their office is to separate from the mass of blood certain fluids which they discharge either immediately, or by other vessels, termed *excretory*.

(93.) FAT is an oily, soft substance, collected between the skin and the muscles, in the interstices of the muscles, about the viscera, &c. and contained in a fine spongy kind of network, called *cellular membrane*.

(94.) By the term VISCERA, is understood part contained in a great cavity, without being connected to it through their whole extent. Such are the stomach, intestines, &c. in the abdomen. Other anatomical terms will be explained as they occur.

PART I. OSTEOLOGY.

SECT. I. Of the BONES in general, and their APPENDAGES.

(95.) Our Almighty Creator evidently designed the bones to give shape and firmness to the human fabric; to form levers for the muscles to act upon, and to defend those parts from external injury which are most immediately necessary to life; as the brain, spinal marrow, heart, lungs, &c.—The fibres of a bone, when first formed, are very soft and gelatinous; until, by the addition of solid matter, they grow by degrees to the hardness of cartilage, and at length arrive at the state of perfect bone. But this change is neither made in a very short period, nor begun in all the parts of the same bone at the same time. Flat bones, that have their fibres directed to all sides, begin to ossify in or near a middle point; but the cylindrical bones, and all others whose fibres are nearly parallel, begin about the middle of each fibre, and thence shoot forth to their extremities; not always indeed in continued lines, but frequently beginning new ossifications, which soon join the former; and by the continual addition of this ossifying matter, the bones increase till they become sufficiently hard.

(96.) The ossification of bones depends principally on their vessels being so disposed, and of such diameters, as to separate a liquor, which may easily turn into a bony substance, when it is deprived of its thinner parts; as seems plain from the observation of the callous matter separated after fractures and ulcers, where part of the bone is taken out: For, in these cases, the vessels extending themselves, and the liquors added to them are gradually formed into granulated flesh; which fills up all the space which the bone is taken from, and then hardens till it becomes as firm as any part of the bone. This happens frequently, even when

when the ends of the diseased bone are at a considerable distance from each other.

The induration of bones is also greatly assisted by their being exposed, more than any other parts, to the strong pressure of the great weights they support, to the violent contraction of the muscles fixed to them, and to the force of the parts they contain, which endeavour to make them their own further growth. By all this pressing force, the solid fibres and vessels of bones are pressed closer, and such particles of the fluids contained in these vessels, as are fit to be united to the fibres, are sooner and more firmly incorporated with them, while the remaining fluids are forcibly driven out by the veins, to be mixed with the mass of blood. In consequence of this, the vessels gradually diminish as the bones harden. In old and consumptive persons, and sometimes in diseased or wounded limbs, bones decrease as do the fleshy parts, though not so fast, because of their hardness. Sometimes the ossifying matter runs out of the bones, and forms bony excrescences; and frequently in very old men it is deposited in the coats of the arteries, and renders them incapable of their functions, so that they no longer have power to propel the blood, and the extreme parts mortify.

Though the cartilages and arteries are not subject to these changes, yet no part is exempt from them; for a large portion of the muscular substance of the heart itself has been found perfectly ossified. On the other hand, it sometimes happens, that there is a deficiency of this ossifying matter. This is evident in some fractures, where no callus will form, and consequently the bone remains disunited. The same thing happened once in the lower jaw of an adult body; and all that part on one side, which is beyond the teeth, was of a substance between that of a cartilage and a ligament. In children that died of the rickets, the bones have proved very spongy; and the periosteum in some places many times its natural thickness; but the cartilages and cartilaginous epiphyses had no apparent alteration in their texture, though enlarged to more than twice their natural diameters. All the facial bones have a large middle cavity, which contains an oily MARROW, and a great number of lesser cells towards their extremities, which contain a bloody marrow. The marrow is of very considerable use to the bones; for by running their transverse canals, and passing from the transverse to the longitudinal ones, it is communicated to all the plates to soften and connect their fibres, whereby they are preserved from becoming brittle; as we see they do in burnt bones, or bones long exposed to the air, in people labouring with old age, lues, or scurvy. In all which cases the oil is either in too little quantity, or has its natural good qualities impaired. Besides this advantage which the substance of bones has from the marrow, their articulations are said to receive much benefit from it: for it is thought, that the marrow passes into the articular cavities, through the holes which are in the bones near the large joints. And as a proof of this, it is alledged, that butchers, upon seeing the greater or lesser quantity of marrow in the bones of cows; can

tell whether they have travelled far or little before they were slaughtered.

(99.) Every one of the cells, that contain the marrow, is lined with a fine membrane, and that in the larger cells is also contained in thin membranous vesicles. Through the substance of these membranes, to which anatomists have given the name of *internal periosteum*, the blood vessels are also spread; their trunks entering obliquely, about the middle of the cylindrical bones. It is from the branches of these vessels that the marrow is secreted, while other branches enter the internal substance of the bones for their nourishment; and the reason why they enter obliquely is, that they may not weaken the bones by dividing too many fibres in the same place. If the bones had been formed of the same quantity of matter, without any cavities, they would not, if they were straight, be able to sustain the same weight. But being made hollow, their strength to resist breaking transversely is increased as much as their diameters are increased, without increasing their weights: a mechanism which proves yet more convenient for birds, the bones of whose wings, and for the same reason their quills, have very large cavities. But the bones in the legs of all animals are more solid, being formed to support weight; and men's bodies being supported by two limbs, the bones of those limbs are therefore made more solid than those of quadrupeds. In a fractured bone, in which the same kind of matter, that produced bone at first, is thrown out from the broken ends, there is formed a mass of callous matter, of equal solidity with any part of the bone, and of equal or greater diameter. Hence the strength of the bone in that place is even greater than it was before: a wise provision of nature, since bones, when once broken, are seldom set in so good a direction as at first; and therefore they would be more liable to be broke in the same place again, and would be reunited with greater difficulty, or perhaps not at all.

(100.) The first objects of consideration in osteology, are the body and the extremities of a bone. The ancients gave the name of *diaphysis* to the body or middle part, and divided the extremities into *apophysis* and *epiphysis*. An *apophysis*, or *process*, as it is more commonly called, is an eminence continued from the body of the bone, whereas an *epiphysis* is at first a sort of an appendage to the bone, by means of an intermediate cartilage. Many epiphyses, which appear as distinct bones in the fœtus, afterwards become apophyses; for they are at length so completely united to the body of the bone as not be distinguishable from it in the adult state. It is not unusual, however, at the age of 18 and even 20 years, to find the extremities of bones still in the state of epiphysis.

(101.) The names given to the processes of bones are expressive of their shape, size, or use; thus if a process is large and of a spherical form, it is called *caput*, or *head*; if the head is flatted, it is termed *condyle*. Some processes, from their resemblance to a stileto, a breast, or the beak of a crow, are called *styloid*, *mastoid*, or *coracoid*: others are styled *ridges* or *spines*. The two processes of the os femoris derive their name of *trochanters* from their use.

(102.) Bones, as already observed, have their cavities as well as their processes. These cavities either extend quite through the substance, or appear only as depressions. The former are called *foramina* or *boles*, and these foramina are sometimes termed *canals* or *conduits*, according to their form and extent. Of the depressions, some are useful in articulation. These are called *cotylod* when they are deep, as is the case with the *os innominatum*, where it receives the head of the *os femoris*; or *glenoid* when they are superficial, as in the *scapula*, where it receives the *os humeri*. Of the depressions that are not designed for articulation, those which have small apertures are called *sinuses*; others that are large, and not equally surrounded by high brims, are styled *fossæ*; such as are long and narrow, *furrows*; or if broad and superficial without brims, *sinuosities*. Some are called *digital impressions*, from their resemblance to the traces of a finger on soft bodies. The bones composing the skeleton are so constructed, that the end of every bone is perfectly adapted to the extremity of that with which it is connected, and this connection forms what is called their *articulation*.

(103.) ARTICULATION is divided into *diarthrosis*, *synarthrosis*, and *amphiarthrosis*, or moveable, immoveable, and mixed articulation. Each of the two first has its subdivisions. Thus the *diarthrosis*, or moveable articulation, includes, 1. the *enarthrosis*, as it is called, when a large head is admitted into a deep cavity, as in the articulation of the *os femoris* with the *os innominatum*. 2. *Arthrodia*, when a round head is articulated with a superficial cavity, as is the case of the *os humeri* and *scapula*. 3. *Ginglimus*, or hinge like articulation, as in the connection of the thigh-bone with the *tibia*. The *enarthrosis* and *arthrodia* allow of motion to all sides; the *ginglimus* only of flexion and extension.

(104.) The SYNARTHROSIS, or immoveable articulation, includes, 1. The suture, when the two bones are indented into each other, as is the case with the parietal bones. 2. Gomphosis, when one bone is fixed into another, in the manner the teeth are placed in their sockets.

(105.) The term AMPHIARTHROSIS is applied to those articulations which partake both of the *synarthrosis* and *diarthrosis*, as is the case with the bones of the vertebræ, which are capable of motion in a certain degree, although they are firmly connected together by intermediate cartilages.

(106.) SYMPHYSIS is the union of two bones into one; as in the lower jaw, for instance, which in the fœtus consists of two distinct bones, but becomes one in a more advanced age, by the ossification of the uniting cartilage.—When bones are thus joined by the means of cartilages, the union is styled *synchondrosis*; when by ligaments *syneursis*.

(107.) Bones that are not calculated for motion, as those of the skull, the *ossa innominata*, &c. also bones with their epiphyses, when they meet, press into each other, and form *utures*, which soon disappear in those that join, while their ossific matter is soft; but those that grow harder before they meet, press more rudely into each other, and make

more uneven sutures, some of which in the scull remain to the greatest age. It also happens sometimes, that while a bone is ossifying from its centre, a distant part begins a new ossification, and forms a distinct bone, which may happen to be any figure. These bones are oftenest found in the lambdoidal suture, and are there called *ossificationes triquetra*. But the ends or sides of bones, that are intended for motion, are hindered from uniting by the cartilages which cover them; for while these cartilages are eroded, the bones very readily unite, and form an *anchylosis*.

(108.) The extremities of all those bones that are articulated for very manifest motions, or that are not placed against other bones, are tipped with *epiphyses* or additional bones, which in some measure determine their growth and figure. The epiphyses are united chiefly to such bones as are destined for frequent and violent motion; and for this purpose they are wisely framed of a larger diameter than the bone they belong to. By this means, the surface of contact between the two bones of any articulation being increased, their conjunction becomes firmer, and the muscles inserted into them act with greater force, by reason of their axes being further removed from the centre of motion.

(109.) Bones in general are composed of a great many plates, each of which is made up of fibrils or strings united by smaller fibrils; which being irregularly disposed, and interwoven with the other larger fibres, make a reticular work. This texture is plainly seen in the bones of fœtuses, which have not their parts closely compacted, and in the bones of adults which have been long exposed to the weather, or whose composition has been loosened by diseases. The chinks, which are generally made according to the directions of the larger fibres of bones, that have undergone the action of fire or of the weather, shew the greater strength of these, than of the fibres which connect them.

(110.) But although the exterior part of bone is composed of firm compact plates, yet they are all more or less cavernous internally. In some (e.g. the thin part of the *scapula*) the solid sides are brought so near, that little cavity can be seen; and in others (*os humeri*, *os femoris*, &c.) the cavities are large and visible. But the internal spongy texture is evident in young animals; and some of it may be seen in those of the greatest age. This spongy cavernous internal part of bones is generally called their *cancelli*, or *lattice work*.

(111.) All the bones in the human body, except the teeth, and those parts of bones which are covered with cartilage, or where muscles or ligaments arise or are inserted, are covered with a fine membrane, which upon the skull is called *pericranium*, but in all other parts *periosteum*. It serves for the muscles to slide easy upon, and to prevent their being lacerated by the rough fibres which compose the bones. It is every where full of small blood vessels, which enter the bones for their nourishment; but the internal substance of the larger bones is nourished by the vessels, which, as has been already observed, enter obliquely through their middle.

(112.) The SYNOVIAL GLANDS are small bodies, supposed to be of a glandular structure, and exceedingly

exceedingly vascular, secreting a fluid of a clear mucilaginous nature, which serves to lubricate the joints. They are placed in small cavities in the articulations, so as to be capable of being gently compressed by the motion of the joint, which expresses their juice in proportion to the degree of friction. When the synovia is wanting, or is of too thick a consistence, the joint becomes stiff, and incapable of flexion or extension. This is what is termed *anchylosis*.

(113.) The **LIGAMENTS** of the JOINTS are either *round* or *bursal*. The round ligaments are white, tendinous, and inelastic. They are strong, flexible, and are found only in the joint of the knee, and in the articulation of the os femoris with the os innominatum. The bursal, or capsular ligaments, surround the whole joint like a purse, and are to be found in the articulations which allow motion every way, as, in the articulation of the arm with the scapula.

(114.) A few of those sacs, called **BURSÆ MUCOSÆ**, were known to former anatomists, but by much the greater number have been since discovered by Dr. MONRO, who observes, that they are to be met with in the extremities of the body only; that many of them are placed entirely on the inner sides of the tendons, between these and the bones. Many others cover not only the inner, but the outer sides of the tendons, or are interposed between the tendons and external parts, as well as between those and the bones. A few such sacs are observed where the processes of bones play upon the ligaments, or where one bone plays upon another. Their proper membrane is thin and transparent, but very dense, and capable of confining air or any other fluid. It is joined to the neighbouring parts by the common cellular substance. Between the bursa and the hard substance of a bone, a thin layer of cartilage or of tough membrane is very generally interposed. To the cellular substance on the outside of the bursa, the adipose substance is connected; except where the bursa covers a tendon, cartilage, or bone, much exposed to pressure or friction. In several places a mass of fat, covered with the continuation of the membrane of the bursa, projects into its cavity. The edges of this are divided into fringes. The inner side of the membrane is smooth, and is extremely slippery from the liquor secreted in it. The structure of the bursa bears a strong resemblance to the capsular ligaments of the joints.

(115.) It would be improper to conclude this section without mentioning the **SKELETON**. The word, *Skeleton*, which by its etymology implies *dry*, a dry preparation, is usually applied to an assemblage of all the bones of an animal united together in their natural order. It is said to be a natural skeleton, when the bones are connected together by their own proper ligaments; and an artificial one, when they are joined by any other substance, as wire, &c. The skeleton is generally divided into the head, trunk, and extremities. The first division includes the bones of the cranium and face. The bones of the trunk are the spine, ribs, sternum, and bones of the pelvis. The upper extremity on each side consists of the two bones of the shoulder, viz. the scapula and clavi-

cle; the bone of the arm or os humeri; the bones of the fore-arm, and those of the hand. The lower extremity on each side of the trunk consists of the thigh bone and the bones of the leg and foot.

SECT. II. Of the SUTURES and BONES of the CRANIUM.

(116.) The mutual indentation of one bone with another, forms what is called a **SUTURE**. Those which have proper names we shall describe; those which have not, will be found to derive their names from the bones which they surround. 1. The *coronal suture* runs across the skull, from one upper edge of the sphenoidal bone to the other, and joins the parietal to the frontal bones. 2. The *sagittal suture* joins the parietal bones; begins at the os occipitis, and is continued to the os frontis. In children it descends to the nose, the os frontis in them being two bones; and sometimes it is found in adult subjects. 3. The *lambdoidal suture* joins the back part of the ossa bregmatis, or parietal bones, to the upper part of the occipital. In this suture are frequently observed small bones called ossa triquetra, and sometimes they occur in other sutures. 4. The *squamous suture* is formed by the upper part of the temporal and sphenoidal bones wrapping over the lower edges of the parietal bones. 5. The *transverse suture* runs across the face through the bottoms of the orbits of the eyes. It joins the lower edge of the frontal bone to the os sphenoides, maxillæ superioris, ossa nasi, unguis, plana, palati, and malarum.

(117.) An evident advantage, arising from the skull being divided into so many bones is, that it is neither so liable to be fractured, nor to have fractures extended so far as would happen were it composed of one bone only. This structure is also convenient to the process of ossification, as has been already shewn; and it is still more important to infants in the birth, because these bones not being perfect at that time, admit of being pressed together, so as to make the head conform to the shape and dimensions of the parts through which it is to pass.

(118.) Ten of the bones of the head compose the **CRANIUM**, the use of which is, to contain the brain, and defend it from external injuries. These bones merit particular description.

(119.) 1. & 2. The **OSSA PARIETALIA** are two large bones which compose the superior and lateral parts of the skull. On their inside they are remarkably imprinted by the arteries of the dura mater, exhibiting somewhat the appearance of the branches of a tree.

(120.) 3. The **Os FRONTIS** forms the upper and fore part of the cranium. Its inferior parts compose the superior portions of the orbit of the eyes, where, on its insides, are impressed the valvuli of the brain. In its middle above the os ethmoides usually arises a thin spine, which strengthens that part of the bone, it being otherwise weak from its flatness. In some skulls this spine is wanting; but then the bone is usually thicker in that place, and from its middle, externally, goes a process which supports the bones of the nose. Immediately above the os ethmoides

moides in this bone is a small blind hole, through which runs a vein into the beginning of the longitudinal sinus of the dura mater; and on the upper edge of each orbit, a small perforation, or notch, through which nerves and an artery pass to the forehead; it has also a small hole in each orbit, near the *os planum*, through which passes a branch of the fifth pair of nerves. In the substance of this bone near the nose are two, three, four, and sometimes five sinuses, which open into the nose; they differ very much in different persons, and are very rarely found in children. These sinuses, and the spine in this bone, make it very dangerous, if not impracticable, to apply a trephine on the middle and lower part of the fore-head.

(121.) 4. The *Os ETHMOIDES*, or *sew-like bone*, is about two inches in circumference, and is seated in the anterior part of the basis of the skull, being almost surrounded by the bone last described. It is pierced with a number of holes, through which the olfactory nerves pass. From its middle arises a large process named *crista galli*; and opposite to this a thin one which in part divides the nose. The greater part of the *laminæ spongiosæ* in the nose belong to this bone.

(122.) 5. The *Os SPHENOIDES* is of so very irregular a shape as scarcely to allow of verbal description. It is seated in the middle of the basis of the skull, and is bounded by the *os frontis*, *ethmoides*, *vomer*, *occipitis*, *maxillæ superioris*, *ossa parietalia*, *palati*, *malarum*, *temporum*, and *petrosa*, which are parts of the former bones. In its inside, next the brain, is a cavity named *cella turcica*, which is bounded by four processes called *clinoides*; under the two foremost of which pass the internal carotid arteries, and from their outsides are continued two thin long processes upon that part of the frontal bone, which separates the anterior lobes of the brain from the posterior. Opposite to the *cella turcica* is a process which makes part of the *septum narium*. On the outside of the skull adjoining to the upper jaw, are two processes of this bone on each side, named *pterygoides*, from which arise one on each side near the palate, which have no name. Over these pass the tendons of the *pterygostaphalina externi* muscles; and nearer towards the occiput, between these and the styloid processes of the *ossa petrosa*, arise two more small rugged processes. Under the *cella turcica*, in this bone, is a sinus or two, mostly found in adults, but in children, consisting only of such a spongy substance as is seen in the ends of some of the bones. According to some writers, this sinus belongs properly to the *os ethmoides*. At the inside of the basis of the two anterior clinoid processes are two round holes, which are the first foramina of the skull; through these the optic nerves pass. Almost under these, towards the sides of the skull, are two irregular slits, named *foramina lacera*, or the second foramina of the skull, through which pass nerves and blood vessels into the orbits of the eyes. Under these again, towards the occiput, are two round holes, which make the third foramina, and through which pass nerves to the face. About half an inch nearer the occiput are two more, of an oval figure, which are the fourth foramina, and through which pass the

largest branches of the fifth pair of nerves. A straw's breadth farther are two very small ones called the fifth foramina, through which those branches of the carotid arteries enter that are bestowed upon the dura mater. Between this last described bone and the *ossa petrosa* are two large rough holes, in which are sometimes seen large veins; and from these holes, through part of the *os sphenoides*, under the pterygoid processes proceed the small apertures, through which pass arteries to the back part of the nose.

(123.) 6 & 7. The two *Ossa TEMPORUM* are situated below the parietal bones, at the middle and lower parts of the sides of the skull. They have each, at their back parts, one large spongy process called *mammillaris*, or *mastoides*; and from the lower and middle parts of each, a process issues, which joins the *ossa malarum*, and which is named *zygomaticus* or *zygomaticeus*.

(124.) 8 & 9. The two *Ossa PETROSA* lie between the former bones and the occipital bones, or rather are portions of the former, as they are never found separate in adult bodies. Each on its outside has one long slender process called *styliformis*, and near the side of this process a foramen, running obliquely forwards into the skull, and through which the carotid arteries pass to the brain. These are the sixth foramina, and two foramina in the inside of the skull leading to the organs of hearing, which are the seventh foramina. The ridges on the upper parts of each of these bones help to keep the brain steady, and are strong supports to the thin and flat parts of the skull. What remains to be said of this bone belongs properly to the description of the organs of hearing, to which we refer. Between the last described bones and the following bone are two large holes, which are the 8th foramina. Through these pass the 8th pair of nerves and the lateral sinuses. Sometimes there are two on each side, one for the nerve and one for the sinus. To these foramina we may add another very small one on each side, through which pass the *portiones duræ* of the auditory nerves; and sometimes there is another for the passage of an artery.

(125.) 10. The *Os OCCIPITIS* forms all the back part of the skull. It is bounded by the sphenoidal, temporal, petrosal, and parietal bones. It has two small apophyses, by which it is articulated to the spine. Near those apophyses are two small foramina, which are the ninth of the skull, and through them pass the ninth pair of nerves. Between these is the great or tenth foramen, through which the medulla oblongata descends into the spine, the cervical arteries enter, and the cervical veins pass out. In the inside of this bone is a crucial spine impressed by the longitudinal and lateral sinuses; and on the outside, opposite to the middle of this spine, in some bodies, is an apophysis, and from that down to the great foramen a small thin spine. The spines in this bone are of the same use with those in the *os frontis* and other bones, viz. to strengthen it. The thinner parts of this bone are also defended by the muscles that cover them; a kind of provision which is very necessary, since we can least defend this part, and blows here are often attended with the most fatal consequences. There exists in most skulls

foramina behind each apophysis of the occipital bone. Through these pass sinuses from the lateral sinuses to the external cervical veins; and by means of these passages, as in all other communications of the same sort, the blood passes from those that happen to be surcharged by any posture of the head, into those that from the same posture would have been almost empty. Some skulls as want these foramina have two sinuses which answer the same purpose. Any person acquainted with each bone of the cranium, can, without difficulty, examine them as they stand named, so as to know the shapes, sizes, distances, &c. of their several parts, and the forms, capacities, &c. of the cavities formed by them. This is of great use towards understanding the anatomy of the parts contiguous to, contained within, or connected with them.

SECT. III. Of the BONES of the FACE, and MOUTH.

(126.) The face is that irregular pile of bones which compose the fore and under part of the head. These are divided by authors into the *upper and lower maxillæ*, or jaws. The upper jaw consists of 13 bones, exclusive of the teeth. Of these 6 are placed on each side of the maxilla superior, and one in the middle. The bones, which are in pairs, are the ossa nasi, ossa malarum, ossa unguis, ossa maxillaria, ossa palati, and ossa spongiosa inferiora. The single bone is the vomer.

(127.) 1. The Ossa NASI make the upper part of the nose, and form that kind of arch, which is fitted to sustain such injuries as the nose is most exposed to, as blows, bruises, &c.

(128.) 2. The Ossa MALARUM compose the anterior, lower, and outer parts of the orbits of the eyes. They have each a short process, which process joins the processus jugales of the temporal bones, and form arches which have been called ossa jugalia.

(129.) 3. Ossa UNGUIS are situated immediately below the os frontis towards the nose, and within the orbits of the eyes, whose anterior and inner parts they help to compose. Between each of these and the upper jaw is a foramen as large as a goose quill, for the passage of the lachrymal duct into the nose. Through this the puncta lachrymalia carry off any superfluous moisture from the eyes.

(130.) 4. The Os MAXILLARE SUPERIOR is often described as single, though it evidently consists of two bones joined by a suture, which is scarce ever obliterated. It has two processes, which join to the os frontis, and make part of the nose; and a third, which joins to the cartilage of the septum nasi. Its upper and outer parts compose the lower portions of the orbits of the eyes; its lower part, all that part of the face under the checks, eyes, and nose to the mouth, and two thirds of the roof of the mouth. A little below the orbits of the eyes, in this bone, are two holes, and behind the dentes incisores one more, which divides into two, as it opens into the nose, on each side of the septum nasi. Between the posterior grinding teeth and the orbits of the eyes are two great sinuses, called antra maxillæ superioris, which open in the upper part of the nose. In the

lower edge of this jaw are the alveoli, or sockets for the teeth. All the body of the maxillary bone is hollow, and leaves a large sinus, which is commonly called antrum highmorianum. When the os maxillare is separated from all the other bones of the skeleton, its antrum appears to have a large aperture into the nostrils; but, in a recent subject, it is so covered at its back part by the palate bone, in the middle by the os spongiosum inferius, and before by a strong membrane, that one or sometimes two holes, scarcely so large as a crow quill, are only left at the upper part; which, after a short winding process, open into the nostrils between the two ossa spongiosa. At the bottom of this cavity, we may often observe some protuberances, in which the small points of the roots of the teeth are contained. This cavern and the sockets of the teeth are often divided by the interposition of only a very thin bony plate, which is liable to be eroded by matter, or to be broke in drawing a tooth.

(131.) 5. The Ossa PALATI are two small bones that form the back part of the roof of the mouth, and a small part of the bottom of each orbit. Between the ossa palati and os maxillare, near the pterygoid processes of the sphenoidal bone, are two small foramina, through which arteries and nerves pass to the palate.

(132.) 6. The Os SPONGIOSUM is usually treated as a distinct bone, though it is only the spongy laminæ in the nose, of the os ethmoides and ossa plana, but chiefly of the os ethmoides, to which it usually adheres. The Ossa TURBINATA, or SPONGIOSA INFERIORA, resemble the superior ossa spongiosa in shape and substance, but have their anterior and upper edges contiguous to the transverse ridges of the nasal processes of the maxillary and palate bones. From their upper straight edge, two small processes stand out: the posterior, which is the broadest, descends to cover some of the antrum highmorianum; the anterior rises up to join the os unguis, and to make part of the lachrymal duct.

(133.) 7. The VOMER, so called from its resemblance to a *plow-share*, is seated between the bones of the palate, and the sphenoidal bone. It is also joined to the process of the ethmoides, and part of the lower jaw. Its fore part is spongy, and is continued to the middle cartilage of the nose. This bone and cartilage form the *septum nasi*.

(134.) 8. The Ossa PLANA are seated immediately beyond the foregoing bones, in the orbits of the eyes, and are near thrice as big. They are rather smooth surfaces of the os spongiosum, than distinct bones, and are very often imperfect.

(135.) 9. The MAXILLA INFERIOR, or *Lower Jaw*, is articulated with loose cartilages to the temporal bones, by two processes, named condyloides. Near these arise two more, called coronales, and at the inside of the chin a small rough processus innominatus. In the inside of this bone, under each processus coronalis, is a large foramen, which runs under the teeth, and passes out near the chin. Through this foramen, the vessels pass that belong to the teeth; and in the upper edge of this jaw are the ALVEOLI or sockets for the TEETH, which seldom exceed 16 in each jaw. The 4 first

in each are called *incisores*, the two next *canini*, the rest *molares*. The 4 last of these are named *dentes sapientie*, because they do not appear till men arrive at years of discretion. The *incisores* and *canini* have only one single root, but the *molares* more; the eight first, two; and the rest, some 3, some 4, especially in the upper jaw; where also they are spread wider, because that jaw being more spongy than the other, the teeth need more space to fix them. Each of these roots has a foramen, through which pass an artery, vein, and nerve, which are expanded in a fine membrane that lines the cavity in each tooth. These vessels and membrane are the seat of the *tooth-ach*. The teeth of children cast off in consequence of the pressure of the new teeth, which causes the roots of the first teeth to be absorbed. When teeth are drawn from the jaws of adult persons, the sockets are absorbed, and new teeth very rarely, if ever supply the place of those that have been extracted. All the teeth are covered, above the socket, with a very hard, white vitreous substance called *enamel*, which is equally useful and ornamental. It is thickest on the grinding surface, and becoming gradually thinner terminates insensibly at the neck of the tooth. It serves to preserve the teeth, and while the enamel remains sound there is no danger of *tooth-ach*; but when once it is broken or injured, it is impossible to restore it.

(136.) We cannot close this section without taking notice of the *Os Hyoides*, which, though it is not one of the bones of the *face*, cannot be ranked any where so properly, as after the bones of the *mouth*. It is placed at the root of the tongue, and was so called by the ancients, on account of its supposed resemblance to the Greek letter *υ*. The body, which is the middle and broadest part of the bone, is so placed that it may be easily felt at the fore part of the throat. Anteriorly it is irregularly convex, and its inner surface is unequally concave. Its cornua, or horns, which are flat and a little bent, being much longer than the body, may be described as forming the sides of the *υ*. The appendices, or little horns, are two processes which rise up from the articulations of the cornua with the body, and are usually connected with the styloid process on each side by means of a ligament. The uses of this bone are to support the tongue, and afford attachment to a great number of muscles; some of which perform the motions of the tongue, while others act on the larynx and fauces.

SECT. IV. Of the BONES of the TRUNK.

(137.) The TRUNK consists of the *spine*, *pelvis*, and *thorax*. 1. The SPINE is composed of 24 vertebrae, besides those of the *os sacrum* and *coccygis*. Seven of these belong to the neck, and the first of them is called *atlas*, because it immediately supports the head. Its upper side has two cavities, into which the apophyses of the *os occipitis* are received; but these two cavities together, unlike all other joints, are laterally portions of concentric circles, by which means they are but as one joint, and so suffer the head to move easily side ways, which otherwise it could not do than the knee, which also has two heads

and two cavities. The under side of this bone has a very flat articulation with the next; by which means it is fitted for a rotatory motion. The second vertebra is called *dentata*, or axis, from a process which passes through the former bone, and is the axis upon which it turns; nevertheless all the vertebrae of the neck contribute something to the rotatory motion of the head. The *processus dentatus* is strongly tied to the *os occipitis*, and to the atlas by ligaments, to prevent its hurting the spinal marrow. Of the vertebrae 12 belong to the back, and 5 to the loins. The *os sacrum* consists sometimes of 5, sometimes of 6 bones, and the *os coccygis* of 4. If the spine had been composed of fewer bones, they must have either not been capable of bending so much, and so variously as they do, or have bent more in each joint, which would have endangered the spinal marrow, that runs through them.

(138.) The superior VERTEBRÆ of the neck being fixed behind the head's centre of gravity, the neck is so far bent forward, as that the last of these vertebrae, which has a firm bearing upon those of the thorax, falls exactly under the centre of gravity. Those of the thorax are bent backwards, behind the centre of motion, to make room for the parts contained in the thorax; and that they might not be made too weak by this structure, they are formed for less motion than the other vertebrae. Those in particular which are bent farthest from the centre of gravity have the least motion. The middle vertebrae of the loins are again bent forwards under the centre of gravity, or near it; and from thence they go backwards to the *os sacrum*, where being fixed to the *ossa innominata* behind the centre of gravity, the articulation is therefore firm and without motion, and from thence the *ossa innominata* are so formed, as that their sockets, into which the thigh bones are admitted and enjoy a free motion, are exactly under the centre of gravity.

(139.) In all these vertebrae, except the first, there is a middle anterior spongy body, by which they are firmly articulated with a very strong intervening ligament; from the middle of the hind part of each, except the first, stands a process named *spinalis*; and from every one a process on each side, called *transversalis*, and two superior, and two inferior short ones, by which the back parts of the vertebrae are articulated, named *obliqui superiores*, and *inferiores*. The fore part of the 7 vertebrae of the neck, and two upper of the back, are flat forwards, to make room for the trachea. The third and fourth of the back are acute, to give way to the vessels of the lungs and heart, and they are directed to the right side for the better situation of the heart, which makes that side of the breast more convex than the other. The spinal processes of the 2d, 3d, 4th, and 5th vertebrae of the neck are forked; the two last long and horizontal, the three or four upper ones of the back like them, only a little declining. The middle ones of the back run obliquely downwards, and the processes of the remaining vertebrae become successively thicker, stronger, and less declining; those of the loins being horizontal, like the last of the neck. The muscles, that are inserted into the spinal processes of the vertebrae of the

the *un-named bone*, in the adult subject, is in young persons composed of three bones; the upper named *os ilium*, the lower and posterior *os ischii*, and the anterior *os pubis*. The upper edge of the ilium is called its spine, the anterior part of the spine its *apex*, and a little lower the *processus innominatus*. The *os ilium* has two processes, the one named the obtuse process, and the other the acute. In the centre of these bones is the *acetabulum* or socket in which the motions of the thigh bone are performed. In the bottom of this socket is another cavity, in which lies the lubricating gland which supplies this joint with *synovia*. Between the *os ischium* and *pubis* a very large irregular hole is left, which, from its resemblance to a door or shield, has been called *thyroides*. This hole is all, except the niche for the posterior crural nerve, filled up, in a recent subject, with a strong ligamentous membrane, that adheres very firmly to its circumference. From this membrane chiefly the two obturator muscles, external and internal, take their rise. The great design of this hole, besides rendering the bone lighter, is to allow a strong enough origin to the obturator muscles, and sufficient space for lodging their bellies; that there may be no danger of disturbing the functions of the contained viscera of the pelvis, by the action of the internal, nor of the external being bruised by the thigh bone, especially by its lesser trochanter.

SECT. V. Of the BONES of the UPPER EXTREMITY.

(146.) The upper extremity consists of the SHOULDER, the ARM, and the HAND. 1. In describing these we shall begin with the CLAVICULA or collar-bone, which is connected at one end to the sternum, by a loose cartilage, and at the other to the processus acromion of the scapula; at a sufficient distance from the breast, to prevent the shoulders from coming too near together.

(147.) 2. The SCAPULA is united to the sternum by the clavicle. Its chief connection however is to the ribs and spine, by means of the same muscles that direct its motions. In such quadrupeds as have no clavicles, it is fixed only by muscles, whose actions give to this bone a great deal of that motion which seems to belong to the joint of the shoulder. The under side of this bone is a little concave, partly to fit the outer surface of the ribs on which it moves, and partly to give room for the subscapularis muscle. On the outside of the scapula rises a large spine, the fore part of which is called *processus acromion* and to which the clavicle is fixed. In men and such quadrupeds as have clavicles, and use their fore limbs like arms, this process and spine are much larger and more prominent. By this the muscles are placed farther from the centre of motion, and are thereby able to act with greater effect. Near this process is another called *coracoides*, from whose extremity and with similar advantages, arise two muscles of the arm. This process with the former, and a flat ligament between them both, hinder the *os humeri* from being dislocated upwards. The side opposite to the socket is called the basis of the scapula, and the lower edge *costa inferior* from its figure, which is thick and like a rib to the

scapula; but its upper edge being very thin, is improperly so called in the human subject, although it may be otherwise in many quadrupeds. At the fore part of this edge, close to the coracoid process, is a semicircular niche or groove for the passage of blood vessels, which niche is closed above with a ligament and sometimes with bone. The scapula and clavicle are joined by plain surfaces tipped with cartilage. The scapula is connected to the head, *os hyoides*, *vertebræ*, ribs, and arm bone, by muscles, that have one end fastened to these bones, and the other to the scapula, so as to move it upwards, downwards, backwards, or forwards; by the quick succession of these motions, its whole body is carried in a circle. But being also often moved as upon an axis perpendicular to its plane, its circumference turns in a circle whose centre this axis is. Whichever of these motions it performs, it always carries the outer end of the clavicle and the arm along with it.

(148.) The ARM is divided into two parts, which are articulated with each other at the elbow, viz. The arm properly so called and the fore arm. The arm consists of one bone, viz. The *os HUMERI*, which at its upper end or head, where it is joined to the scapula, is somewhat flat, and much larger than the socket which receives it. At its superior part are two processes for the insertion of the muscles of the arms, and between these processes is a long channel, in which lies the tendon of the biceps cubiti. At its lower end are two considerable processes, both formed to give origin to muscles which move the wrist and fingers; and the flexors in these parts being much more considerable than the extensors, the inner process from which the flexors arise is formed much larger than the outer, from which the extensors take their origin; between these processes is the elbow joint. That part to which is attached the upper end of the radius, is fitted not only for the motion of the elbow, but also for the rotatory motion of the radius. The rest of this joint is made of portions of unequal, but concentric, circles, like the thanks of quadrupeds; and this inequality prevents the ulna from dislocating sideways, which so small a joint with so considerable a share of motion would otherwise be very liable to. Of a like use is the little sinus on the fore part of the humerus, and the large one behind; the first receiving a process of the ulna when the arm is bent, and the other, the olecranon, when the arm is in a state of extension.

(149.) The fore arm consists of two bones, viz. the Ulna and Radius. The ULNA, at its upper end, has one large process called *olecranon*, and a small process on the fore part; and on one side between these is also a small cavity, which receives the upper end of the radius for its rotatory motion. Down the side of this bone, next the radius, is a sharp edge, from which the ligament arises, which connects both together. At the lower end is a process, called *styloformis*, and a round head, which is received into the radius and adapted for the rotatory motion of the elbow.

(150.) The upper end of the RADIUS is received into the ulna, and joined to the humerus, in a manner chiefly favourable to its rotatory motion; for the strength of the elbow joint receives but

sockets, which receive the thigh bone, and between these, a rough process, to which the crucial ligaments of the knee joint are connected. Near the upper end is a process, into which the ligament or tendon of the patella is inserted, and at the lower is the process, which forms the inner angle, and secures this bone from dislocating outwards. Towards its upper end, the tibia is triangular, and even concave on the side next the muscles; but lower, as the muscles grow less and become tendinous, the bone grows rounder; that being upon the whole a stronger form. Yet it is by no means so strong a bone as that of the thigh, though it bears a greater weight. It is perhaps somewhat the more able to do this by being straighter and shorter, and bearing the weight of the body in a more perpendicular direction.

(158.) The FIBULA is the small long bone, placed on the outside of the leg, opposite to the external angle of the tibia; the shape of it is irregularly triangular. The head of the fibula has a superficial circular cavity formed on its inside, which, in a recent subject, is covered with a cartilage; and it is so closely connected to the tibia by ligaments, as to allow only a small motion backwards and forwards. This head is protuberant and rough on its outside, where a strong round ligament and the musculus biceps are inserted; and, below the back part of its internal side, a tubercle may be remarked, that gives rise to the strong tendinous part of the *solæus* muscle. Its upper end is joined to that bone below the joint of the knee, and its lower end sinks into a shallow sinus of the same bone, forming lower down the external angle. This process, with that of the tibia, strengthens the angle joint. It is a doubtful point, whether this bone contributes to the support of the body; but, as affording a convenient surface for the attachment of muscles, it is a part of considerable importance.

(159.) IV. The FOOT consists of the *tarsus*, *metatarsus* and *toes*; and contains in all 26 bones. 1. The TARSUS is composed of 7 bones, viz. the *astragalus*, *os calcis*, *os naviculare*, *os cuboides*, and 3 *ossa cuneiformia*. The ASTRAGALUS is the uppermost bone of the foot. It is large and is articulated with both the tibia and the fibula. It supports the tibia, and is supported by the *os calcis*, which being projected backwards, makes a long lever for the muscles to act with, that extend the ankle and raise the body upon the toes. These two bones have a considerable motion between themselves, and the astragalus also with the *os naviculare*. All the rest have an obscure motion one with another, and with the bones of the *metatarsus*: the principal share of these motions falling towards the great toe, where lies the greatest stress of action. These bones, by yielding in this manner, are less liable to be broken; and acting as a kind of spring under the leg, render the motions of the body in walking more easy and graceful, and the bones to which they give support, less subject to be fractured in any violent exertion.

(160.) The OS CALCIS, is of a very irregular figure, and is the largest bone of the foot. Behind, it is formed into a considerable tuberosity called *the heel*; without this tuberosity, which supports us in an erect posture, and when we walk,

we should be apt to fall backwards. On the internal surface of this bone, there is a considerable sinuosity, which affords a passage to the tendon of a muscle: and to the posterior part of it, a strong tendinous cord, called *tendo achillis*, is attached, which is formed by the tendons of several muscles united together. The articulations of all these bones are secured by ligaments.

(161.) The OS NAVICULARE, is so called on account of its resemblance to a little bark. At its posterior part, which is concave, it receives the *astragalus*; anteriorly it is articulated with the cuneiform bones, and laterally it is connected with the OS CUBOIDES, which forms an irregular cube, and is articulated with the *os calcis*; it supports the two last bones of the *metatarsus*, and joins the third cuneiform bone and the *os naviculare*.

(162.) Each of the OSSA CUNEIFORMIA, resembles a wedge, and from this similitude the name is derived. They are placed next to the *metatarsus*, are united to the *os naviculare*, and support the three first metatarsal bones. When these 7 bones of the tarsus are viewed together in the skeleton, they appear convex above, where they help to form the upper part of the foot; and concave underneath, where they form the hollow of the foot, in which the vessels, tendons, and nerves of it are placed secure from pressure.

(163.) II. The METATARSUS is made up of 5 bones. The first of these supports the great toe and is much larger than the rest, which nearly resemble each other in size. These bones are articulated by one extremity with the cuneiform bones and the *os cuboides*, and by the other end with the toes.

(164.) III. The TOES, like the fingers, consist of three bones each, except the great toe, which is formed of 2. Those of the other 4 are distinguished into 3 phalanges. In walking, the toes bring the centre of gravity perpendicular to the advanced foot; and as the soles of the foot are naturally concave, we can at pleasure increase this concavity, and form a kind of vault, which adjusts itself to the different inequalities that occur to us in walking; and which, without this mode of arrangement, would incommode us exceedingly.

(165.) There are several small bones besides these above described that are met with only in the adult skeleton, and in persons who are advanced in life; which, from their resemblance to the seed of the *sesamum*, are called OSSA SESAMOIDEA.—They are commonly seen at the first joint of the great toe, and sometimes at the joints of the thumb; they are likewise found at the lower extremity of the fibula, upon the condyles of the thigh bone, under the *os cuboides* of the tarsus, and in other parts of the body. Their size and number seem constantly to be increased by age and hard labour; and as they are generally found in situations where tendons and ligaments are most exposed to the action of muscles, they are now generally considered as ossified portions of ligaments or tendons. The upper surface of these bones is usually convex, and adherent to the tendon that covers it; the side which is next the joint is smooth and flat. Though their formation is ac-

Fig. 2.

Fig. 4.

Fig. 5.

Fig. 6.



to a muscular texture, forming what is called a *muscle*; and the urinary bladder, stomach, intestines, &c. are enabled to act upon their contents, merely because they are provided with muscular fibres. These are called *INVOLUNTARY* muscles, because their motions are not dependent on the will. The muscles of respiration, being in some measure influenced by the will, are said to have a *MIXED* motion.

(181.) *MUSCULAR FIBRES* are bundles of red-coloured threads, which perform all the motions visible in the human body. When many of these fibres are collected together, and appear more evidently red, they are called a *MUSCLE*.—In every muscle we meet with long soft threads of *fibre*, somewhat elastic, or extensible, and almost constantly disposed parallel with each other; and thick, being surrounded with a good deal of cellular substance, are by that fastened together into little bundles, called *lacertuli*; which are again tied together into larger bundles, by a more loose cellular net-work, that contains some fat; and between these we constantly perceive membranous partitions and stripes of the cellular substance removing them farther from each other, till at last a number of them combined together, either parallel or inclined, are surrounded with a more thin red dense cellular membrane, continuous with that of their partitions; and this being again surrounded by a thicker plate of the cellular substance, parts the whole bundle from the adjacent flesh, and gives it the denomination of a *single* or *retro muscle*.

(182.) In every one of these threads there appears a lesser series of filaments, which, by oblique cuneiforms, are cemented to others of the same kind, forming together a large fibre. The general nature of the muscles, but more especially those which are inserted into the bones, have other fibres fixed to them; but these are condensed into a more slender, hard, and shining substance, of a white colour, which has the name of *TENDON*. When the tendinous fibres expand into a broad surface, they form what is called an *aponeurosis*.

(183.) Some anatomists have described the muscular fibres to be strings of bladders, and have endeavoured to account for muscular motion by an expansion made from an influx of blood and animal spirits into these bladders; but as the muscles do not increase their bulk sensibly in contracting, this hypothesis cannot be correct. Other anatomists thought that in this way the muscles might be contracted by a swelling, scarce sensible, if the bladders were but very small; for, say they, supposing a bladder of any determined bigness to raise a weight a foot, a hundred bladders, whose diameters are each a hundredth part of the former, will raise the weight to the same height. But the force of inflation, and the swelling of all together, will be ten thousand times less, and it will also raise ten thousand times less weight, which they have not observed. Therefore not one little string of bladders, but ten thousand, must be applied to do the same thing that the one bladder will do; and they will have the same swelling; otherwise, it would be easy to shew how to make a *perpetuum mobile* of almost any force.

(184.) Muscles are of two sorts, *rectilinear* and *penniform*. The *RECTILINEAR MUSCLES* have their fibres almost parallel, in the same or near the same direction with the axis of the muscle.—The latter have their fibres joined, in an oblique direction, to a tendon passing in or near the axis, or else on their outside. Rectilinear muscles, if their origins and insertions lie in little compass, are never of any considerable thickness, unless they are very long, because the outer fibres would compress the inner ones, and render them almost useless. Every rectilinear muscle, therefore, whose inner fibres are compressed by the outer, has its inner fibres longer than its external fibres, in order that they may be capable of an equal quantity of contraction.

(185.) The *PENNIFORM MUSCLES*, though in a manner free from the inconvenience of one fibre compressing another, and though by the obliquity of their fibres nothing is abated of their moment, yet the fibres of the penniform muscles becoming more and more oblique as they contract their strength decreases, and their velocity increases, which makes them less uniform in their actions than the rectilinear muscles: For in all cases, just so much more weight as rectilinear fibres will raise than oblique ones, the oblique will move their weight with so much greater velocity than the rectilinear: which is making their moments equal: So that in the structure of an animal, like all mechanic engines, whatever is gained in strength is lost in velocity, and whatever is gained in velocity is lost in strength. A penniform muscle, therefore, is never exerted where a rectilinear muscle can be used; and the cases in which a rectilinear muscle cannot be used, are where the shape of a muscle is such as that the inward fibres would be too much compressed, or where the rectilinear fibres could not have a lever to act with, suitable to their quantity of contraction, which is the case with all the long muscles of the fingers and toes.

(186.) Every muscle must be inserted in, or pass over the centre of motion of the joint it moves, at a distance suitable to its quantity of contraction, and the quantity of motion in the joint moved; for if it were to be inserted too near, the motion of the joint would be performed before the muscle became completely contracted; if too far off, the muscle would cease to contract before the whole motion of the joint was performed. And though the quickness and quantity of motion in a muscle will be, *ceteris paribus*, as the length of its fibres; (for if a fibre 4 inches long will contract one inch in a given time, a fibre 8 inches long will contract two inches in the same time; and the strength of a muscle or power to raise a weight, *ceteris paribus*, will be as the number of its fibres; for if one fibre will raise a grain weight, 20 fibres will raise 20 grains;) Yet two muscles of equal magnitude, the one long, and the other short, will both move the same weight with the same velocity when applied to a bone; because the levers they act with must be as their lengths, and therefore the penniform and short thick muscles are never applied to a bone for the sake of strength, nor long fibred muscles for quickness; for whatever is gained by the form

of the muscle, whether strength or quickness, must be lost by their insertions into the bone. Either the muscles must not perform all that they can, or the bones must have less motion than they are capable of.

(187.) In the limbs several muscles pass over two joints, both of which are liable to move at once, with a force proportionable to the levers they act with, upon each joint; but either joint being fixed by an antagonist muscle, the whole force of such muscles will be exerted upon the other joint; which in that case may be moved with a velocity equal to what is in both joints, when these muscles act upon both at once. This mechanism is of the utmost importance.

(188.) The proper use and action of any muscle is that which it has without the necessary assistance of any other muscle, and what that is, in a muscle moving a joint, we may always know in any situation, and with what force it acts, *ceteris paribus*, by dropping a line, from the centre of motion of the joint it moves, perpendicular into the axis of the muscle. But in a joint which admits only of flexion and extension, this line must also be perpendicular to the axis of motion in that joint, and the action of the muscles will be in the direction of that particular line, and the force with which it acts in any situation will be, *ceteris paribus*, as the length of that perpendicular line.

(189.) Every muscle, so far as it is distinct, and is moved against any part, is covered with a smooth cellular membrane to make the friction easy; but where the muscles are externally tendinous, their surfaces are generally smooth enough to make such a covering unnecessary. Besides this membrane there is another, known by the name of *fascia tendinosa*, which deserves to be particularly considered. The strong one on the outside of the thigh, which belongs to the *fascialis* and *gluteus* muscles, is of great use, in raising the *gluteus* farther from the centre of motion of the joint it moves, to increase its force. In like manner the fascia detached from the tendon of the *biceps cubiti* alters its direction for the same purpose; but those on the outside of the tibia and cubit, &c. are only flat tendons from which the fibres of the muscles arise as from the bones. There exist also in many places tendons between the muscles, from which each muscle arises in like manner; for the bones themselves are not sufficient to give origin to half the fibres of the muscles that belong to them.

(190.) We cannot close this section without taking notice of the **IRRITABILITY** of the muscles. If a muscle is pricked or irritated, it immediately contracts. This is called its irritable principle, and this irritability is to be considered as the characteristic of muscular fibres, and may serve to prove their existence in parts that are too minute to be examined by the eye. This power which disposes the muscles to contract when stimulated, independent of the will, is supposed to be inherent in them; and is therefore named by Haller *vis insita*. This property is not to be confounded with elasticity, which the membrane and other parts of the body possess in a greater or less degree in common with the muscles; nor with sensibility, for the heart, though the most irritable, seems to be the least sensible of any of the muscular parts of the body. After a muscular fibre has contracted, it soon returns to a state of relaxation, till it is excited afresh, and then it contracts and relaxes again. We may likewise produce such a contraction, by irritating the nerve leading to a muscle, although the nerve itself is not affected. This principle is found to be greater in small than in large, and in young than in old, animals. In the voluntary muscles these effects of contraction and relaxation of the fleshy fibres are produced in obedience to the will by what may be called the *vis nervosa*, a property that is not to be confounded with the *vis insita*. The existence of a *vis insita*, however different from *vis nervosa*, has been called in question by several particularly by Doctor Monro, who has stated very formidable objections against it, in his *Observations on the Nervous System*, of which we shall afterwards have occasion to take particular notice, under **NEUROLOGY**.

SECT. II. Of the PARTICULAR MUSCLES.

(191.) To prevent tautology and circumlocution, we have thrown the enumeration and description of the particular muscles into the form of a table; in which the name, origin, insertion, and principal use of each muscle, will be seen at one glance, described in few words. It is however to be understood, that this does not include all the muscles of the body; since those belonging to the eyes, internal ear, *intestinum rectum* &c. are mentioned in other parts of the work. We must also remark, that though almost all the muscles are in *pairs*, mention is here made only of the muscles of one side.

TABLE OF THE MUSCLES.

(192.) MUSCLES SITUATED UNDER THE INTEGUMENTS OF THE CRANIUM.

Name.	Origin.	Insertion.	Use.
1. Occipito-frontalis.	From the transverse ridge of the os occipitis.	Into the skin of the eye-brows.	To pull the skin of the head backwards, and to raise the eye-brows and skin of the fore-head.
2. Corrugator supercilii.	From above the joining of the os frontis, os nati, and os maxillare.	Into the inner part of the occipito-frontalis.	To draw the eye-brows towards each other, and to wrinkle the forehead.

(193.) MUSCLES OF THE EYE-LIDS.

Name.	Origin.	Insertion.	Use.
1. Orbicularis palpebrarum.	From around the edge of the orbit.	Into the nasal process of the os maxillare.	To shut the eye.
2. Levator palpebrae superioris.	From the bottom of the orbit, near the optic foramen.	Into the cartilage of the upper eye lid.	To open the eye.

(194.) MUSCLES OF THE EXTERNAL EAR.

1. Atlas auricularis.	From the tendon of the occipitofrontalis near the os temporis.	Into the upper part of the ear.	To raise the ear.
2. Anterior auricularis.	From near the back part of the zygoma.	Into an eminence behind the helix.	To raise this eminence, and to pull it forwards.
3. Retrahentes (4) auricularis.	From the outer and back part of the root of the mastoid process.	Into the convex part of the concha.	To stretch the concha, and pull the ear backwards.

(195.) MUSCLES OF THE CARTILAGES OF THE EAR.

1. Tragus.	From the outer and middle part of the concha, near the tragus.	Into the upper part of the tragus.	To depress the concha, and pull the point of the tragus a little outwards.
2. Anti-tragicus.	From the root of the inner part of the helix.	Into the upper part of the anti-tragus.	To dilate the mouth of the concha.
3. Transversus auricularis.	From the upper part of the concha.	Into the inner part of the helix.	To stretch the concha and scapha, and likewise to pull the parts it is connected with towards each other.
4. Helicis major.	From the upper, anterior, and acute part of the helix.	Into the cartilage of the helix, a little above the tragus.	To depress the upper part of the helix.
5. Helicis minor.	From the lower and fore part of the helix.	Into the helix, near the fissure in its cartilage.	To contract the fissure.

(196.) MUSCLE OF THE NOSE.

Compressor (1) nasae.	From the upper part of the root of the ala nasi.	Into the nasal process of the os maxillare, and anterior extremity of the os nasi.	To straighten the nostrils, and likewise to corrugate the skin of the nose.
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(197.) MUSCLES OF THE MOUTH AND LIPS.

1. Levator labii superioris, alaeque nasi.	From the outer part of the orbital process of the os maxillare, and from the nasal process of that bone, where it joins the os frontis.	Into the upper lip and ala of the nose.	To draw the upper lip and skin of the nose upwards and outwards.
2. Levator anguli oris.	From the os maxillare superius, between the orbital foramen and the first dens molaris.	Into the orbicularis oris at the angle of the mouth.	To raise the corner of the mouth.
3. Zygomaticus major.	From the os maxillare, near the zygomatic suture.	Into the angle of the mouth.	To raise the angle of the mouth, and make the cheek prominent, as in laughing.
4. Zygomaticus minor.	Immediately above the origin of the zygomaticus major.	Into the angle of the mouth.	To raise the angle of the mouth obliquely outwards.
5. Buccinator.	From the alveoli of the dentes molares in the upper and lower jaws.	Into the angle of the mouth.	To contract the mouth and draw the angle of it outwards and backwards.
6. Depressor labii superioris, alaeque nasi.	From the os maxillare superius, immediately above the gums of the dentes incisores.	Into the root of the ala nasi and upper lip.	To draw the ala nasi and upper lip downwards.

<i>Name.</i>	<i>Origin.</i>	<i>Insertion.</i>	<i>Use.</i>
7. Depressor anguli oris,	At the side of the chin from the lower edge of the maxilla inferior.	Into the angle of the mouth.	To draw the corner of the mouth downwards.
8. Depressor labii inferioris.	From the lower and anterior part of the maxilla inferior.	Into the upper lip.	To draw the under lip downwards and somewhat outwards.
9. Levator labii inferioris.	From near the gums of the incisors and caninus of the maxilla inferior.	Into the under lip and skin of the chin.	To raise the under lip and skin of the chin.
10. Orbicularis oris (c)			To shut the mouth by constricting the lips.

(198.) MUSCLES OF THE LOWER JAW.

1. Temporalis.	From part of the os bregmatis and os frontis; squamous part of the os temporis; back part of the os malæ, and the temporal process of the os sphenoides (D).	Into the coronoid process of the lower jaw.	To move the lower jaw upwards.
2. Masseter (E).	From the malar process of the os maxillare, and the lower edges of the os malæ, and of the zygomatic process of the os temporis.	Into the basis of the coronoid process, and that part of the jaw which supports that and the condyloid process.	To raise and likewise to move the jaw a little forwards and backwards.
3. Pterygoideus internus.	From the inner surface of the outer wing of the pterygoid process of the os sphenoides, and from the process of the os palati, that helps to form the pterygoid fossa.	Into the lower jaw on its inner side and near its angle.	To raise the lower jaw, and draw it a little to one side.
4. Pterygoideus externus.	From the external ala of the pterygoid process, a small part of the adjacent os maxillare, and a ridge in the temporal process of the os sphenoides.	Into the fore part of the condyloid process of the lower jaw, and likewise of the capsular ligament.	To move the jaw forwards and to the opposite side (F); and at the same time to prevent the ligament of the joint from being pinched.

(199.) MUSCLES SITUATED AT THE FORE PART OF THE NECK.

1. Latissimus colli (G).	From the cellular membrane covering the pectoral, deltoid, and trapezius muscles.	Into the side of the chin and integuments of the cheek.	To draw the cheeks and skin of the face downwards; and, when the mouth is shut, to draw all that part of the skin to which it is connected below the lower jaw upwards.
2. Mastoideus (H).	From the upper part of the sternum, and from the upper and fore part of the clavicle.	Into the mastoid process, and as far back as the lambdoidal suture.	To move the head to one side, or, when both muscles act, to bend it forwards.

(200.) MUSCLES SITUATED BETWEEN THE TRUNK AND THE OS HYOIDES.

1. Omo-hyoideus (I).	From the upper costa of the scapula near its niche; from part of a ligament that extends across this niche, and sometimes by a few fibres, from the coracoid process.	Into the basis of the os hyoides.	To draw the os hyoides in an oblique direction downwards.
2. Sterno-hyoideus.	From the cartilage of the first rib, the inner and upper part of the sternum, and a small part of the clavicle.	Into the basis of the os hyoides.	To draw the os hyoides downwards.
3. Hyo-thyroideus.	From part of the basis and horn of the os hyoides.	Into a rough oblique line at the side of the thyroid cartilage.	To raise the thyroid cartilage, or depress the os hyoides.

<i>Name.</i>	<i>Origin.</i>	<i>Insertion.</i>	<i>Use.</i>
4. Stermo-thyroides.	From between the cartilages of the 1st and 2d ribs, at the upper and inner part of the sternum.	Immediately under the hyo-thyroides.	To pull the thyroid cartilage downwards.
5. Crico-thyroides.	From the anterior part and side of the cricoid cartilage.	Into the lower part and inferior horn of the thyroid cartilage.	To pull the cricoid cartilage upwards and backwards, or the thyroid forwards and downwards.

(101.) MUSCLES SITUATED BETWEEN THE OS HYOIDES AND THE LOWER JAW.

1. Digastricus (r).	From a fossa at the root of the mastoid process, and likewise from the os hyoides.	Into the lower and anterior part of the chin.	To draw the lower jaw downwards.
2. Stylo-hyoides (L).	From the basis of the styloid process.	Into the side and fore part of the os hyoides near its base.	To draw the os hyoides obliquely upwards.
3. Mylo-hyoides (M.).	From the inside of the lower jaw, between the last dens molaris and the chin.	Into the basis of the os hyoides.	To move the os hyoides to either side, forwards or upwards.
4. (H) Genio-hyoides.	From the inside of the chin.	Into the base of the os hyoides.	To move the os hyoides forwards or upwards.
5. Genio-glossus.	From the inside of the chin.	Into the tongue and basis of the os hyoides.	To move the tongue in various directions.
6. Hyo-glossus (G.).	From the horn, basis, and appendix of the os hyoides.	Into the tongue laterally.	To draw the tongue downwards and inwards.
7. Lingualis.	Laterally from the root of the tongue.	Into the extremity of the tongue.	To shorten the tongue and draw it backwards.
8. Stylo-glossus.	From the styloid process, and sometimes also from a ligament that extends from thence to the angle of the lower jaw.	Into the side of the tongue from the root to near its tip.	To move the tongue backwards and to one side.
9. Stylo-pharyngeus.	From the basis of the styloid process.	Into the side of the pharynx and posterior part of the thyroid cartilage.	To raise the thyroid cartilage and pharynx, and likewise to dilate the latter.
10. Circumflexus palati.	From near the bony part of the Eustachian tube, and from the spinous process of the os sphenoides.	Into the semilunar edge of the os palati, and the velum pendulum palati (P.).	To dilate and draw the velum obliquely downwards.
11. Levator palati.	From the membranous part of the Eustachian tube, and the extremity of the os petrosus.	Into the velum pendulum palati.	To pull the velum backwards.

(202.) MUSCLES SITUATED ABOUT THE FAUCES.

1. Palato-pharyngeus.	From the lower and anterior part of the cartilaginous extremity of the Eustachian tube (Q); the tendinous expansion of the circumflexus palati; and the velum pendulum palati near the basis and back part of the uvula.	Into the upper and posterior part of the thyroid cartilage.	To raise the pharynx and thyroid cartilage, or to pull the velum and uvula backwards and downwards.
2. Constrictor isthmi faucium.	From near the basis of the tongue laterally.	Into the velum pendulum palati, near the basis and fore part of the uvula.	To raise the tongue and draw the velum towards it (K.).
3. Azygos uvulae.	From the end of the suture that unites the ossa palati.	Into the extremity of the uvula.	To shorten the uvula, and bring it forwards and upwards.

(203.) MUSCLES SITUATED AT THE BACK PART OF THE PHARYNX.

<i>Name.</i>	<i>Origin.</i>	<i>Insertion.</i>	<i>Use.</i>
1. Constrictor pharyngis superior.	From the cuneiform process of the occipital bone; the pterygoid process of the os sphenoides, and from each jaw near the last dental molaris (s.)	Into the middle of the pharynx.	To move the pharynx upward and forwards, and to compress its upper part.
2. Constrictor pharyngis medius (τ.)	From the horn and appendix of the os hyoides, and from the ligament that unites it with the thyroid cartilage.	Into the middle of the processus cuneiformis of the occipital bone, about its middle and before the great foramen.	To draw the os hyoides and pharynx upwards, and to compress the latter.
3. Constrictor pharyngis inferior (ν.)	From the cricoid and thyroid cartilage.	Into the middle of the pharynx.	To compress part of the pharynx.

(204.) MUSCLES ABOUT THE GLOTTIS.

1. Crico-arytænoidæus lateralis.	From the side of the cricoid cartilage.	Into the basis of the arytænoid cartilage laterally.	To open the glottis.
2. Crico-arytænoidæus posterior.	From the cricoid cartilage posteriorly.	Into the basis of the arytænoid cartilage posteriorly.	To open the glottis.
3. Aytænoidæus obliquus.	From the basis of one of the arytænoid cartilages.	Near the extremity of the other arytænoid cartilage.	To draw the parts it is connected with towards each other.
4. Aytænoidæus transversus.	From one of the arytænoid cartilages laterally.	Into the other arytænoid cartilage laterally.	To shut the glottis.
5. Thyreo-arytænoidæus.	From the posterior and under part of the thyroid cartilage.	Into the arytænoid cartilage.	To draw the arytænoid cartilage forwards.
6. Aytæno-epiglottideus.	From the upper part of the arytænoid cartilage laterally.	Into the side of the epiglottis.	To move the epiglottis outwards.
7. Thyreo-epiglottideus.	From the thyroid cartilage.	Into the side of the epiglottis.	To pull the epiglottis obliquely downwards (w.)

(205.) MUSCLES AT THE FORE PART OF THE NECK, CLOSE TO THE VERTEBRÆ.

1. Rectus capitis internus major.	From the anterior extremities of the transverse processes of the five lowermost cervical vertebræ.	Into the fore part of the cuneiform process of the os occipitis.	To bend the head forwards.
2. Rectus capitis internus minor.	From the anterior and upper part of the first cervical vertebræ.	Near the basis of the condyloid process of the os occipitis.	To assist the last described muscle.
3. Rectus capitis lateralis.	From the anterior and upper part of the transverse process of the first cervical vertebra.	Into the os occipitis, opposite to the stylo-mastoid foramen.	To move the head to one side.
4. Longus colli.	Within the thorax, laterally from the bodies of the three uppermost dorsal vertebræ; from the basis and fore part of the transverse processes of the first and second dorsal vertebræ; and of the last cervical vertebra; and lastly from the anterior extremities of the transverse processes of the 6th, 5th, 4th, and 3d cervical vertebræ.	Into the second cervical vertebra anteriorly.	To pull the neck to one side (x.)

(206.) MUSCLES AT THE FORE PART OF THE ABDOMEN.

<i>Name.</i>	<i>Origin.</i>	<i>Insertion.</i>	<i>Use.</i>
1. <i>Obliquus externus.</i>	From the lower edges of the eight inferior ribs, near their cartilages.	Into the linea alba (v), ossa pubis (z), and spine of the ilium (a).	To compress and support the viscera, assist in evacuating the feces and urine, drawn down the ribs, and bend the trunk forwards, or obliquely to one side.
2. <i>Obliquus internus.</i>	From the spinous process of the three lowermost lumbar vertebræ, the back part of the os sacrum, the spine of the ilium, and back part of Fallopius's ligament (c.)	Into the cartilages of all the false ribs, linea alba (b), and fore part of the pubis.	To assist the obliquus externus.
3. <i>Transversalis.</i>	From the cartilages of the seven inferior ribs; the transverse processes of the last dorsal, and four upper lumbar vertebræ; the inner part of Fallopius's ligament, and the spine of the ilium.	Into the linea alba and cartilago ensiformis.	To compress the abdominal viscera.
4. <i>Rectus abdominis.</i>	From the upper edge of the pubis and the symphysis pubis.	Into the cartilages of the 5th, 6th, & 7th ribs, and the edge of the cartilago ensiformis (d.)	To compress the fore part of the abdomen, and to bend the trunk forwards.
5. <i>Pyramidalis.</i>	From the anterior and upper part of the pubis.	Into the linea alba and inner edge of the rectus, commonly about two inches above the pubis.	To assist the lower portion of the rectus.

(207.) MUSCLES AT THE FORE PART OF THE THORAX.

1. <i>Pectoralis major.</i>	From the cartilaginous ends of the 5th and 6th ribs; the sternum, and anterior part of the clavicle.	Into the upper and inner part of the os humeri (f).	To draw the arm forwards, or obliquely forwards.
2. <i>Subclavius.</i>	From the cartilage of the first rib.	Into the under surface of the clavicle.	To move the clavicle forwards and downwards, and to assist in raising the first rib.
3. <i>Pectoralis minor (g).</i>	From the upper edges of the 3d, 4th, and 5th ribs.	Into the coracoid process of the scapula.	To move the scapula forwards and downwards, or to elevate the ribs.
4. <i>Serratus magnus.</i>	From the eight superior ribs.	Into the basis of the scapula.	To bring the scapula forwards.

(208.) MUSCLES THAT CONCUR IN FORMING THE THORAX.

1. <i>Diaphragma h.</i>			
2. <i>Levatores costarum.</i>	From the transverse processes of the last cervical, and the eleven upper dorsal vertebræ.	Into the upper side of each rib near its tuberosity.	To move the ribs upwards and outwards.
3. <i>Intercostales externi.</i>	From the lower edge of each upper rib.	Into the superior edge of each lower rib.	To elevate the ribs.
4. <i>Intercostales interni (i).</i>			
5. <i>Intercostales interni (h).</i>	From the cartilago ensiformis, and the lower and middle part of the sternum.	Into the cartilages of the 2d, 3d, 4th, 5th, and 6th ribs.	To depress the cartilages of the ribs.

(209.) MUSCLES AT THE BACK PART OF THE NECK AND TRUNK.

1. <i>Trapezius (l), or cucullaris.</i>	From the middle of the os occipitis, and the spinous processes of the two inferior cervical, and of all the dorsal vertebræ (m).	Into the posterior half of the clavicle part of the acromion, & the spine of the scapula.	To move the scapula.
			2. <i>Rhomboides</i>

<i>Name.</i>	<i>Origin.</i>	<i>Insertion.</i>	<i>Use.</i>
2. Rhomboideus (n.)	From the spinous processes of the three lowermost cervical, and of all the dorsal vertebræ.	Into the basis of the scapula.	To move the scapula upwards and backwards.
3. Latissimus dorsi.	From part of the spine of the os ilium, the spinous processes of the os sacrum and lumbar vertebræ, and of six or eight of the dorsal vertebræ; also from the four inferior false ribs near their cartilages.	Into the os humeri, at the inner edge of the groove for lodging the long head of the biceps muscle.	To draw the os humeri downwards & backwards, and to roll it upon its axis.
4. Serratus inferior posticus.	From the spinous processes of the two lowermost dorsal, and of three of the lumbar vertebræ.	Into the lower edges of the three or four lowermost ribs near their cartilages.	To draw the ribs outwards, downwards, and backwards.
5. Levator scapulæ.	From the transverse processes of the four uppermost vertebræ colli.	Into the upper angle of the scapula.	To move the scapula forwards and upwards.
6. Serratus superior posticus.	From the lower part of the ligamentum colli, the spinous process of the lowermost cervical vertebra, and of the two superior dorsal vertebræ.	Into the 2d, 3d, and 4th ribs.	To expand the thorax.
7. Splenius (o).	From the spinous processes of the four or five uppermost vertebræ of the back, and of the lowermost cervical vertebra.	Into the transverse processes of the two first cervical vertebræ, the upper and back part of the mastoid process, and a ridge on the os occipitis.	To move the head backwards.
8. Complexus (p).	From the transverse processes of the four or five uppermost dorsal, and of the six lowermost cervical vertebræ.	Into the os occipitis.	To draw the head backwards.
9. Trachelo-mastoideus (q).	From the transverse processes of the first dorsal vertebra, and four or five of the lowermost cervical vertebræ.	Into the mastoid process.	To draw the head backwards.
10. Rectus capitis posticus major.	From the spinous process of the second cervical vertebra.	Into the os occipitis.	To extend the head and draw it backwards.
11. Rectus capitis posticus minor.	From the first vertebra of the neck.	Into the os occipitis.	To assist the rectus major.
12. Obliquus superior capitis.	From the transverse process of the first cervical vertebra.	Into the os occipitis.	To draw the head backwards.
13. Obliquus inferior capitis.	From the spinous process of the second cervical vertebra.	Into the transverse process of the first cervical vertebra.	To draw the face towards the shoulder, and to move the first vertebra upon the second.
14. Sacro-lumbalis (r).	From the back part of the os sacrum, spine of the ilium, spinous processes, and roots of the transverse processes of the vertebræ of the loins.	Into the lower edge of each rib.	To draw the ribs downwards, move the body upon its axis, assist in erecting the trunk, and turn the neck backwards, or to one side.
15. Longissimus dorsi (s).	The same as that of the sacro-lumbalis.	Into the transverse processes of the dorsal vertebræ.	To stretch the vertebræ of the back, & keep the trunk erect.
16. Spinalis dorsi.	From the spinous processes of the uppermost lumbar and lowermost dorsal vertebræ.	Into the spinous processes of the nine superior dorsal vertebræ.	To extend the vertebræ.

<i>Name.</i>	<i>Origin.</i>	<i>Insertion.</i>	<i>Use.</i>
17. <i>Semi-spinalis dors.</i>	From the transverse processes of the 7th, 8th, 9th, and 10th vertebrae of the back.	Into the spinous processes of the four uppermost dorsal, and lowermost of the cervical vertebrae.	To extend the spine obliquely backwards.
18. <i>Multifidus spine (t).</i>	From the os sacrum, ilium, oblique and transverse processes of the lumbar vertebrae, transverse processes of the dorsal, and four of the cervical vertebrae.	Into the spinous processes of the lumbar, dorsal, and six of the cervical vertebrae.	To extend the back and draw it backwards, or to one side.
19. <i>Semi-spinalis colli.</i>	From the transverse processes of the five or six uppermost dorsal vertebrae.	Into the spinous processes of the 2d, 3d, 4th, 5th, and 6th cervical vertebrae.	To stretch the neck obliquely backwards.
20. <i>Sclenus (u).</i>	From the transverse processes of the five inferior cervical vertebrae.	Into the upper and outer part of the first and second ribs.	To move the neck forwards, or to one side.
21. <i>Inter-spinales (x).</i>	From the upper part of each of the spinous processes of the six inferior cervical vertebrae.	Into the under part of each of the spinous processes of the vertebrae above.	To draw the spinous processes towards each other.
22. <i>Inter-transversales (y).</i>	From the upper part of each of the transverse processes of the vertebrae.	Into the under part of each of the transverse processes of the vertebrae above.	To draw the transverse processes towards each other.

(21c.) **MUSCLES WITHIN THE CAVITY OF THE ABDOMEN, ON THE ANTERIOR AND LATERAL PARTS OF THE SPINE.**

1. <i>Psoas parvus (z).</i>	From the sides and transverse processes of the uppermost lumbar vertebra, and sometimes of the lowermost dorsal vertebra.	Into the brim of the pelvis, at the junction of the os pubis with the ilium.	To bend the loins forwards.
2. <i>Psoas magnus.</i>	From the bodies and transverse processes of the last dorsal, and all the lumbar vertebrae.	Into the os femoris, a little below the trochanter minor.	To bend the thigh forwards.
3. <i>Ilacus internus.</i>	From the inner lip, hollow part, and edge of the os ilium.	In common with the psoas magnus.	To assist the psoas magnus.
4. <i>Quadratus lumborum (a).</i>	From the posterior part of the spine of the ilium.	Into the transverse processes of the four uppermost lumbar vertebrae, the inferior edge of the last rib, and the side of the lowermost dorsal vertebra.	To support the spine, or to draw it to one side.
5. <i>Coccygeus.</i>	From the posterior and inner edge of the spine of the ischium.	Into the lower part of the os sacrum, & almost the whole length of the os coccygis laterally.	To draw the os coccygis forwards and inwards (b).

(211.) **MUSCLES ON THE SCAPULA AND UPPER PART OF THE OS HUMERI.**

1. <i>Deltoides (c).</i>	From the clavicle, processus acromion, and spine of the scapula.	Into the anterior and middle part of the os humeri.	To raise the arm.
2. <i>Supra-spinalis.</i>	From the basis, spine, and upper costa of the scapula.	Into a large tuberosity at the head of the os humeri.	To raise the arm.
3. <i>Infra-spinalis.</i>	From the basis and spine of the scapula.	Into the upper and middle part of the tuberosity.	To roll the os humeri outwards.
4. <i>Teres minor.</i>	From the inferior costa of the scapula.	Into the lower part of the tuberosity.	To assist the infra spinatus.
5. <i>Teres major.</i>	From the inferior angle, and inferior costa of the scapula.	Into the ridge at the inside of the groove formed for the long head of the biceps.	To assist in the rotatory motion of the arm.

<i>Name.</i>	<i>Origin.</i>	<i>Insertion.</i>	<i>Use.</i>
6. Subscapularis.	From the basis, superior and inferior costæ of the scapula.	Into the upper part of a small tuberosity at the head of the os humeri.	To roll the arm inwards.
7. Coraco-brachialis (c).	From the coracoid process of the scapula.	Into the middle and inner side of the os humeri.	To roll the arm forwards and upwards.

(212.) MUSCLES ON THE OS HUMERI.

1. Biceps flexor cubiti.	By two heads, one from the coracoid process, and the other, or long head, from the upper and outer edge of the glenoid cavity of the scapula.	Into the tuberosity at the end of the radius.	To bend the forearm.
2. Brachialis internus.	From the os humeri, below, and at each side of the tendon of the deltoids.	Into a small tuberosity at the fore part of the coronoid process of the ulna.	To assist in bending the forearm.
3. Triceps extensor cubiti.	By three heads: the first from the inferior costa of the scapula; the second, from the upper and outer part of the os humeri; and the third, from the back part of that bone.	Into the upper and outer part of the olecranon.	To extend the forearm.

(213.) MUSCLES ON THE FORE-ARM.

1. Supinator longus.	From the outer ridge and anterior surface of the os humeri, a little above its outer condyle.	Into the radius near its styloid process.	To assist in turning the palm of the hand upwards.
2. Extensor carpi radialis longus.	Immediately below the origin of the supinator longus.	Into the upper part of the metacarpal bone of the middle finger.	To extend the wrist.
3. Extensor carpi radialis brevis.	From the outer and lower part of the outer condyle of the os humeri, and the upper part of the radius.	Into the upper part of the metacarpal bone of the middle finger.	To assist the extensor longus.
4. Extensor digitorum communis.	From the outer condyle of the os humeri.	Into the back part of all the bones of the four fingers.	To extend the fingers.
5. Extensor minimi digiti.	From the outer condyle of the os humeri.	Into the bones of the little finger.	To extend the little finger.
6. Extensor carpi ulnaris.	From the outer condyle of the os humeri.	Into the metacarpal bone of the little finger.	To assist in extending the wrist.
7. Anconæus (f).	From the outer condyle of the os humeri.	Into the outer edge of the ulna.	To extend the forearm.
8. Flexor carpi ulnaris.	From the inner condyle of the os humeri, and anterior edge of the olecranon (g).	Into the os pisiforme.	To assist in bending the hand.
9. Palmaris longus.	From the inner condyle of the os humeri.	Into the internal annular ligament, and aponeurosis palmaris (h).	To bend the hand.
10. Flexor carpi radialis.	From the inner condyle of the os humeri.	Into the metacarpal bone of the fore finger.	To bend the hand.
11. Pronator radii teres.	From the outer condyle of the os humeri, and coronoid process of the ulna.	Into the anterior and convex edge of the radius, near its middle.	To roll the hand inwards.
12. Flexor sublimis perforatus (i).	From the inner condyle of the os humeri, inner edge of the coronoid process of the ulna, and upper and anterior part of the radius.	Into the second bone of each finger.	To bend the second joint of the fingers.

<i>Name.</i>	<i>Origin.</i>	<i>Insertion.</i>	<i>Use.</i>
13. <i>Supinator radii brevis.</i>	From the outer condyle of the os humeri, and posterior surface and outer edge of the ulna.	Into the anterior, inner, and upper part of the radius.	To roll the radius outwards.
14. <i>Abductor pollicis longus.</i>	From the middle and back part of the ulna, interosseous ligament, and radius.	By two tendons into the os trapezium, and first bone of the thumb.	To stretch the first bone of the thumb outwards.
15. <i>Extensor minimus pollicis.</i>	From the back part of the ulna, and interosseous ligament and radius.	Into the convex part of the second bone of the thumb.	To extend the second bone of the thumb obliquely outwards.
16. <i>Extensor major pollicis.</i>	From the back of the ulna and interosseous ligament.	Into the third and last bone of the thumb.	To stretch the thumb obliquely backwards.
17. <i>Indicator.</i>	From the middle of the ulna.	Into the metacarpal bone of the fore-finger.	To extend the fore-finger.
18. <i>Flexor profundus perforans.</i>	From the upper and fore part of the ulna, and interosseous ligament.	Into the fore part of the last bone of each of the fingers.	To bend the last joint of the fingers.
19. <i>Flexor longus pollicis.</i>	From the upper and fore part of the radius.	Into the last joint of the thumb.	To bend the last joint of the thumb.
20. <i>Pronator radii quadratus.</i>	From the inner and lower part of the ulna.	Into the radius, opposite to its origin.	To roll the radius inwards, and of course to assist in the pronation of the hand.

(214.) MUSCLES ON THE HAND.

1. <i>Lumbricales (4).</i>	From the tendons of the perforans.	Into the tendons of the extensor digitorum communis.	To bend the first, and to extend the two last joints of the fingers (1).
2. <i>Abductor brevis pollicis.</i>	From the fore part of the internal annular ligament, os scaphoides, and one of the tendons of the abductor longus pollicis.	Into the outer side of the second bone of the thumb, near its root.	To move the thumb from the fingers.
3. <i>Opponens pollicis.</i>	From the inner and anterior part of the internal annular ligament, and from the os scaphoides.	Into the first bone of the thumb.	To move the thumb inwards, and to turn it upon its axis.
4. <i>Flexor brevis pollicis.</i>	From the os trapezoides, internal annular ligament, os magnum, and os unciniforme.	Into the ossa sesamoides, and second bone of the thumb.	To bend the second joint of the thumb.
5. <i>Abductor pollicis.</i>	From the metacarpal bone of the middle finger.	Into the basis of the second bone of the thumb.	To move the thumb towards the fingers.
6. <i>Abductor indicis.</i>	From the inner side of the first bone of the thumb, and from the os trapezium.	Into the first bone of the fore finger posteriorly.	To move the fore finger towards the thumb.
7. <i>Palmaris brevis.</i>	From the internal annular ligament, and aponeurosis palmaris.	Into the os pisiforme, and the skin covering the abductor minimi digiti.	To contract the palm of the hand.
8. <i>Abductor minimi digiti.</i>	From the internal annular ligament and os pisiforme.	Into the side of the first bone of the little finger.	To draw the little finger from the rest.
9. <i>Flexor parvus minimi digiti.</i>	From the os unciniforme and internal annular ligament.	Into the first bone of the little finger.	To bend the little finger.
10. <i>Abductor metacarpi minimi digiti.</i>	From the os unciniforme and internal annular ligament.	Into the metacarpal bone of the little finger.	To move that bone towards the rest.
11. <i>Interossei interni.</i>	Situated between the metacarpal bones.	Into the roots of the fingers.	To extend the fingers and move them towards the thumb (m).

Name.	Origin.	Insertion.	Use.
12. Interossei externi,	From between the metacarpal bones on the back of the hand.	Into the roots of the fingers.	To extend the fingers; but the first draws the middle finger inwards, the second draws it outwards, and the third draws the ring finger inwards.

(215.) MUSCLES AT THE BACK PART OF THE PELVIS, AND UPPER PART OF THE THIGH.

1. Glutæus (n). maximus.	From the spine of the ilium, posterior sacrospinous ligaments, os sacrum, and os coccygis.	Into the upper part of the <i>linea aspera</i> of the os femoris.	To extend the thigh and draw it outwards.
2. Glutæus medius.	From the spine and superior surface of the ilium.	Into the outer and back part of the great trochanter of the os femoris.	To draw the thigh outwards and a little backwards, and when it is bended to roll it.
3. Glutæus minimus.	From the outer surface of the ilium, and the border of its great niche.	Into the upper and anterior part of the great trochanter.	To assist the former.
4. Piriformis (o).	From the anterior part of the os sacrum.	Into a cavity at the root of the trochanter major.	To roll the thigh outwards.
5. Gemini (p).	By two portions, one from the outer surface of the spine of the ischium; the other from the tuberosity of the ischium and posterior sacrospinous ligament.	Into the same cavity as the piriformis.	To roll the thigh outwards, and likewise to confine the tendon of the obturator internus, when the latter is in action.
6. Obturator internus.	From the superior half of the inner border of the foramen thyroideum.	Into the same cavity with the former.	To roll the thigh outwards.
7. Quadratus (q). femoris.	From the tuberosity of the ischium.	Into a ridge between the trochanter major and trochanter minor.	To move the thigh outwards.

(216.) MUSCLES ON THE THIGH (r).

1. Biceps flexor.	By two heads; one for the tuberosity of the ischium, the other from the <i>linea aspera</i> near the insertion of the glutæus maximus.	Into the upper and back part of the fibula (s).	To bend the leg.
2. Semi-tendinosus.	From the tuberosity of the ischium.	Into the upper and inner part of the tibia.	To bend and draw the leg inwards.
3. Semi-membranosus (t).	From the tuberosity of the ischium.	Into the upper and back part of the head of the tibia.	To bend the leg.
4. Tensor vaginæ femoris.	From the superior and anterior spinous process of the ilium.	Into the inner side of the fascia lata, which covers the outside of the thigh.	To stretch the fascia.
5. Sartorius.	From the superior and anterior spinous process of the ilium.	Into the upper and inner part of the tibia.	To bend the leg inwards (u).
6. Rectus.	By two tendons; one from the anterior and inferior spinous process of the ilium; the other from the posterior edge of the cotyloid cavity.	Into the upper and fore part of the rotula.	To extend the leg.
7. Gracilis.	From the fore part of the ischium and pubis.	Into the upper and inner part of the tibia.	To bend the leg.
8. Vastus externus (x).	From the anterior and lower part of the great trochanter, and the outer edge of the <i>linea aspera</i> .	To the upper and outer part of the rotula.	To extend the leg.
9. Vastus internus.	From the inner edge of the <i>linea aspera</i> , beginning between the fore part of the os femoris and the root of the lesser trochanter.	Into the upper and inner part of the rotula.	To extend the leg.

<i>Name.</i>	<i>Origin.</i>	<i>Insertion.</i>	<i>Use.</i>
10. <i>Crureus</i> (γ).	From the outer and anterior part of the lesser trochanter.	Into the upper part of the rotula.	To extend the leg.
11. <i>Pectinialis.</i>	From the anterior edge of the os pubis, or pectinis, as it is sometimes called.	Into the upper and fore part of the linea aspera.	To draw the thigh inwards, upwards, and to roll it a little outwards.
12. <i>Adductor brevis femoris.</i>	From the upper and fore part of the os pubis.	Near the middle and back of the linea aspera.	To draw the thigh inwards, upwards, and to roll it a little outwards.
13. <i>Adductor medius femoris.</i>	From the fore part of the ramus of the os pubis.	Into the inner and upper part of the linea aspera.	
14. <i>Adductor magnus femoris.</i>	From the lower and fore part of ramus of the os pubis.	Into the whole length of the linea aspera.	
15. <i>Obturator externus.</i>	From part of the obturator ligament, and the inner half of the circumference of the foramen thyroideum.	Into the os femoris, near the root of the great trochanter.	To move the thigh outwards in an oblique direction, and likewise to bend and draw it inwards.

(217.) MUSCLES ON THE LEG.

1. <i>Gastrocnemius</i> (ca) <i>externus.</i>	By two heads; one from the inner condyle, the other from the outer condyle of the os femoris.	By a great round tendon, common to this and the following muscle.	To extend the foot. <
2. <i>Gastrocnemius</i> (bb) <i>internus.</i>	By two heads; one from the back part of the head of the fibula, the other from the upper and back part of the tibia.	By a large tendon (the <i>tendo achillis</i>) common to this and the former muscle, into the lower and back part of the os calcis.	To extend the foot. \
3. <i>Plantaris</i> (cc).	From the upper and posterior part of the outer condyle of the os femoris.	Into the inside of the back part of the os calcis.	To assist in extending the foot.
4. <i>Popliteus</i> (dd).	From the outer condyle of the thigh.	Into the upper and inner part of the tibia.	To assist in bending the leg and rolling it inwards.
5. <i>Flexor longus digitorum pedis</i> (e).	From the upper and inner part of the tibia.	By 4 tendons, which after passing through the perforations in those of the flexor digitorum brevis, are inserted into the last bone of all the toes, except the great toe.	To bend the last joint of the toe.
6. <i>Flexor longus pollicis pedis.</i>	From the back part, and a little below the head of fibula.	Into the last bone of the great toe.	To bend the great toe.
7. <i>Tibialis posterior.</i>	From the back part and outer edge of the tibia, and likewise from the interosseous ligament and adjacent part of the fibula.	Into the inner and upper part of the os naviculare, and side of the os cuneiforme medium.	To move the foot inwards.
8. <i>Peroneus longus.</i>	From the outer side of the head of tibia, and also from the upper, anterior, and outer part of the <i>perone</i> or fibula, to which it adheres for a considerable way down.	Into the metatarsal bone of the great toe.	To move the foot outwards.
9. <i>Peroneus brevis.</i>	From the outer and fore part of the fibula.	Into the metatarsal bone of the little toe.	To assist the last described muscle.
10. <i>Extensor longus digitorum pedis.</i>	From the upper, outer, and fore part of the tibia, interosseous ligament, and inner edge of the fibula.	By four tendons into the first joint of the smaller toes.	To extend the toes.
11. <i>Peroneus tertius.</i>	From the fore part of the lower half of the fibula, and from the interosseous ligament.	Into the metatarsal bone of the little toe.	To bend the foot.

Name.	Origin.	Insertion.	Use.
12. Tibialis anticus.	From the upper and fore part of the tibia.	Into the os cuneiforme internum.	To bend the foot.
13. Extensor proprius pollicis pedis.	From the upper and fore part of the tibia.	Into the convex surface of the bones of the great toe.	To extend the great toe.

(218.) MUSCLES ON THE FOOT.

1. Extensor brevis digitorum pedis.	From the upper and anterior part of the os calcis.	By 4 tendons; one of which joins the tendon of the extensor longus pollicis, and the other three the tendons of the extensor digitorum longus.	To extend the toes.
2. Flexor brevis digitorum pedis.	From the lower part of the os calcis.	By 4 tendons, which, after affording a passage to those of the flexor longus, are inserted into the second phalanx of each of the small toes.	To bend the second joint of the toes.
3. Abductor pollicis pedis.	From the inner and lower part of the os calcis.	Into the first joint of the great toe.	To move the great toe from the other toes.
4. Abductor minimi digiti.	From the outer tubercle of the os calcis, the root of the metatarsal bone of the little toe, and also from the aponeurosis plantaris.	Into the outer side of the first joint of the little toe.	To draw the little toe outwards.
5. Lumbricales pedis.	From the tendons of the flexor longus digitorum pedis.	Into the tendinous expansion at the upper part of the toes.	To draw the toes inwards.
6. Flexor brevis pollicis pedis.	From the inferior and anterior part of the os calcis, and also from the inferior part of the os cuneiforme externum.	By two tendons into the first joint of the great toe.	To bend the first joint of the great toe.
7. Adductor pollicis pedis.	From near the roots of the metatarsal bones of the 2d, 3d, and 4th toes.	Into the outer os sesamoides, or first joint of the great toe.	To draw the great toe nearer to the rest, and also to bend it.
8. Transversales pedis.	From the outer and under part of the anterior end of the metatarsal bone of the little toe.	Into the inner os sesamoides, and anterior end of the metatarsal bone of the great toe.	To contract the foot.
9. Flexor brevis minimi digiti pedis.	From the basis of the metatarsal bone of the little toe.	Into the first joint of the little toe.	To bend the little toe.
10. Interossei pedis interni (ff). Interossei pedis externi (gg).	Situated between the metatarsal bones.		

(219.) NOTES referred to in the foregoing TABLE.

(A) These are three small slender muscles. The inferior one is sometimes wanting.

(B) The nose is affected by the fibres of the occipito frontalis, and by several muscles of the face; but this pair, the compressores, is the only one that is proper to it.

(C) This muscle is in a great measure, if not wholly, formed by the buccinator, zygomatici, depressores, and other muscles that move the lips. Its fibres surround the mouth like a ring.

(D) Some of its fibres likewise have their origin

from a strong fascia that covers the muscle and adheres to the bone round the whole circumference of its origin. When we remove this covering, we find the muscle of a semicircular shape with its radiated fibres, converging and forming a strong middle tendon.

(E) So called from its use in chewing, its derivation being *manducare*, to eat.

(F) This happens when the muscle acts singly. When both act, the jaw is brought horizontally forwards.

(G)

(g) This broad and thin muscular expansion, which is situated immediately under the common integuments, is by Winslow named *musculus cutaneus*. Galen gave it the name of *πλατυσμα μυοειδης* (*Platysma myoides*); the etymology of which is from *πλατυσμος*, dilatatio, *μυς*, *musculus*, and *ιδος* *f. eius*.

(h) This, on account of its two origins, is by Albinus described as two distinct muscles, which he names *sterno-mastoideus* and *cleido-mastoideus*.

(i) As this muscle does not always arise from the coracoid process, it seems to have been improperly named *coraco-hyoideus*, by Douglas and Albinus. Winslow calls it *omo-hyoideus*, on account of its general origin from the scapula.

(k) From *δύο* and *γαστηρ* (*biventer*), because it has two fleshy bellies with a middle tendon. This tendon passes through the stylo-hyoideus.

(l) In some subjects we meet with another muscle, which, from its having nearly the same origin, insertion, and use as this, has been named *sterno-hyoideus alter*.

(m) So named from its arising near the dentes maxillares (*maxilla*), and its being inserted into the os hyoideus.

(n) From *γενυος*, *mentum*, the chin.

(o) From *μεσας*, *corpu*, and *γλωσση*, *lingua*, the tongue.

(p) This muscle in its course forms a round tendon, which, after passing over a kind of hook formed by the inner plate of the pterygoid process of the sphenoid bone, expands into a tendinous membrane.

(q) The few fibres that arise from the Eustachian tube are described as a distinct muscle by Albinus, under the name of *salpingo-pharyngæus*. They serve to dilate the mouth of the tube.

(r) This muscle, and the palato-pharyngæus, likewise serve to close the passage into the fauces, and to carry the food into the pharynx.

(s) The three orders of fibres here mentioned, with a few others derived from the tongue, have given occasion to Douglas to describe them as *three* distinct muscles under the names of *cephalo-pharyngæus*, *mylo-pharyngæus*, *ptery-pharyngæus*, and *glossopharyngæus*.

(t) Douglas makes two muscles of this, the *laryngo-pharyngæus*, and *syndesmo-pharyngæus*.

(u) The crico-pharyngæus and thyro-pharyngæus of Douglas.

(w) When either this or the preceding muscle acts with its fellow, the epiglottis is drawn directly downwards upon the glottis.

(x) When both muscles act, the neck is drawn directly forwards.

(y) The linea alba is that tendinous expansion which reaches from the cartilago ensiformis to the os pubis. It is formed by the interlacement of the tendinous fibres of the oblique and transverse muscles, and on this account some anatomists have considered these as three digastric muscles.

(z) A little above the pubis the tendinous fibres of this muscle separate from each other, so as to form an opening called the *ring* of the obliquus externus, and commonly, though improperly, the *ring* of the abdominal muscles, there being no such aperture either in the transversalis

or obliquus internus. This ring in the male subject affords a passage to the spermatic vessels, and in the female to the round ligament of the uterus.

(a) From the anterior and upper spinous process of the ilium, this muscle is stretched tendinous to the os pubis, and thus forms what is called by some *Fallopian's*, and by others *Poupart's ligament*. The blood-vessels pass under it to the thigh.

(b) The tendon formed by the upper part of this muscle, in its way to the linea alba, is divided into two layers. The posterior layer runs under, and the anterior one over, the rectus muscle.

(c) From this part it detaches some fibres, which extend downwards upon the spermatic chord, and form what is described as the cremaster muscle.

(d) The fibres of the rectus are generally divided by three tendinous interfections. The two upper thirds of this muscle passing between the tendinous layers of the obliquus internus, are inclosed as it were in a sheath; but at its lower part we find it immediately contiguous to the peritonæum, the inferior portion of the tendon of the transversalis passing over the rectus, and adhering to the anterior layer of the obliquus internus.

(e) This muscle is sometimes wanting.

(f) The fibres of this muscle pass towards the axilla in a folding manner, and with those of the latissimus dorsi form the arm-pit.

(g) This and some other muscles derive their name of *ferratus*, from their arising by a number of tendinous or fleshy digitations, resembling the teeth of a saw (*ferra*).

(h) For a description of the diaphragm, see Part V. Sect. III. &c.

(i) The origin, insertion, and use of the internal intercostals, are similar to those of the external. The reader, however, will be pleased to observe, that the intercostales externi occupy the spaces between the ribs only from the spine to their cartilages; there being from thence to the sternum, only a thin membrane, which is spread over the intercostales interni; and that the latter, on the contrary, extend only from the sternum to the angles of each rib.

The fibres of the external muscles run obliquely forwards; those of the internal obliquely backwards. This difference in the direction of their fibres induced Galen to suppose that they were intended for different uses; that the external intercostals, for instance, serve to elevate, and the internal ones to depress the ribs. Fallopius seems to have been the first who ventured to dispute the truth of this doctrine, which has since been revived by Boyle, and more lately still by Hamberger, whose theoretical arguments on this subject have been clearly refuted by the experiments of Haller.

(k) These consist of four, and sometimes of five distinct muscles on each side. Vesalius, and after him Douglas and Albinus, consider them as forming a single muscle, which, on account of its shape, they name *triangularis*. Verheyen, Winslow, and Haller, more properly describe them as so many separate muscles, which, on account of their origin and insertion, they name *sterno-costales*.

Fig. 1.



ANATOMY.

10

Plate VIII.

Fig. 4.

11

Fig. 5.

Fig. 3.



Fig. 6.

Fig. 1.

SORBENTS
of the
Lower
Extremity



Fig. 2.





Muscles.

Arteries.

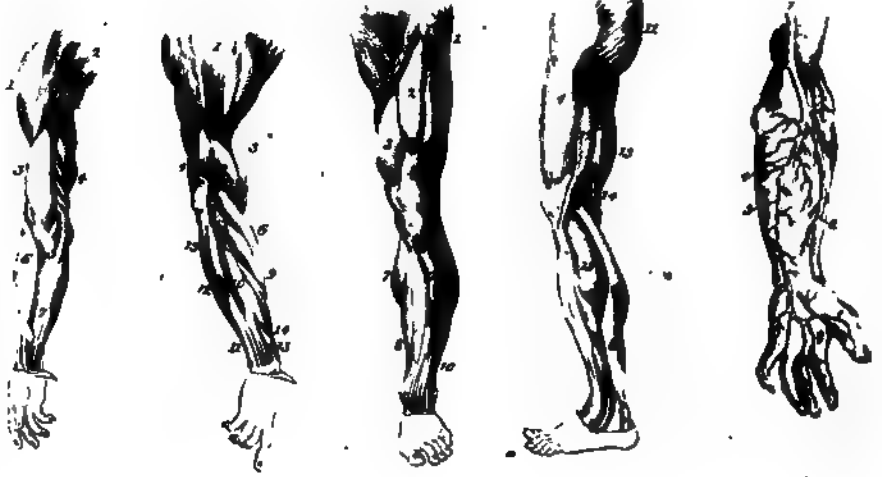


Fig. 4.

consider them as a *triceps*, or single muscle with three heads.

Under the *cruræus* we sometimes meet with two small muscles, to which Albinus has given the name of *faberuræi*. They terminate on the side of the rotula, and prevent the capsular ligament from being pinched. When they are wanting, which is very often the case, some of the heads of the *cruræus* are found adhering to the rotula.

This and the two following muscles have been usually, but improperly, considered as forming a single muscle with three heads, and on that account named *triceps femoris*.

(cc) *Femurpostus, fura*, the calf of the leg.

(dd) This muscle is by some anatomists named *ham*, on account of its being shaped like the sole of a shoe.

(cc) This muscle has gotten the name of *plantaris*, from its being supposed to furnish the aponeurosis that covers the sole of the foot; but it does not in the least contribute to the formation of that tendinous expansion.

(dd) So called on account of its situation at the ham (*poples*).

(ee) This muscle, about the middle of the foot, unites with a fleshy mass, which, from its having first been described by Sylvius, is usually called *massa carnea JACOBI SYLVII*.

(ff) The *interossei interni* are three in number; their use is to draw the smaller toes towards the great toe.

(gg) The *interossei externi* are four in number; the first serves to move the fore toe towards the great toe; the rest move the toes outwards. All the *interossei* assist in extending the toes.

EXPLANATION OF PLATES VI, VII, AND VIII.

(210.) FARTHER EXPLANATION OF PLATE VI.

FIG. 3. MUSCLES of the HEAD, FACE, NECK, &c. 1. *Musculus frontalis*. 2. *Temporalis*. 3. *Orbicularis*. 4. The parotid gland, with its duct, which passes through the *buccinator*. 5. *Mastoi-deus*. 6. *Zygomaticus*. 7. *Elevator labii superioris proprius*. 8. *Elevator labiorum communis*. 9. *Depressor labiorum communis*. 10. *Sphincter oris*. 11. *Depressor labii inferioris proprius*. 12. *Buccinator*. 13. *Sterno-hyoidei*. 14. *Coraco-claviculus*. 15. *Mastoideus*. 16. *Trapezius*. 17. *Pectoralis*. 18. *Deltoides*.

FIG. 4. A POSTERIOR VIEW of the MUSCLES of the TRUNK. 1. *Trapezius*. 2. *Deltoides*. 3. *Latissimus scapulae*. 4. *Teres major*. 5. *Rhom-boides*. 6. *Latissimus dorsi*. 7. *Glutæi*. 8. *Obliquus descendens abdominis*.

FIG. 5. AN ANTERIOR VIEW of the VISCERA in situ. 1. Trachea. 2. The internal jugular vein. 3. The subclavian vein. 4. Cava descendens. 5. The right auricle of the heart. 6. The right ventricle. 7. Part of the left ventricle. 8. Aorta ascendens. 9. Arteria pulmonalis. 10. The right lobe of the lungs, part of which is cut off to shew the great blood-vessels. 11. The left lobe of the lungs. 12. The diaphragm. 13. The liver. 14. The ligamentum rotundum. 15. The gall-bladder. 16. The stomach, pressed by the liver towards the left side. 17. The small intestines. 18. The spleen.

FIG. 6. A VIEW of the POSTERIOR ABDOMINAL VISCERA. 1. The under side of the liver. 2. Ligamentum rotundum. 3. The gall-bladder. 4. The pancreas. 5. The spleen. 6. The kidney. 7. Aorta ascendens. 8. Vena cava ascendens. 9. The emulgent vein. 10. A probe under the spermatic vessels and the arteria mesenterica inferior, and over the ureters. 11. The ureters. 12. The iliac vessels. 13. The rectum in situ. 14. The bladder of urine.

(211.) EXPLANATION OF PLATE VII.

MUSCLES of the UPPER EXTREMITY. 1. *Musculus deltoides*. 2. *Pectoralis*. 3. *Biceps flexor cubiti*. 4. *Triceps extensor cubiti*. 5. *Supra-spinatus*. 6. *Infra-spinatus*. 7. *Teres minor*. 8. *Teres major*. 9. *Triceps extensor cubiti*. 10. *Supra-spinatus*. 11. *Infra-spinatus*. 12. *Teres minor*. 13. *Teres major*. 14. *Triceps extensor cubiti*. 15. *Supra-spinatus*. 16. *Infra-spinatus*. 17. *Teres minor*. 18. *Teres major*. 19. *Triceps extensor cubiti*. 20. *Supra-spinatus*. 21. *Infra-spinatus*. 22. *Teres minor*. 23. *Teres major*. 24. *Triceps extensor cubiti*. 25. *Supra-spinatus*. 26. *Infra-spinatus*. 27. *Teres minor*. 28. *Teres major*. 29. *Triceps extensor cubiti*. 30. *Supra-spinatus*. 31. *Infra-spinatus*. 32. *Teres minor*. 33. *Teres major*. 34. *Triceps extensor cubiti*. 35. *Supra-spinatus*. 36. *Infra-spinatus*. 37. *Teres minor*. 38. *Teres major*. 39. *Triceps extensor cubiti*. 40. *Supra-spinatus*. 41. *Infra-spinatus*. 42. *Teres minor*. 43. *Teres major*. 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*Infra-spinatus*. 637. *Teres minor*. 638. *Teres major*. 639. *Triceps extensor cubiti*. 640. *Supra-spinatus*. 641. *Infra-spinatus*. 642. *Teres minor*. 643. *Teres major*. 644. *Triceps extensor cubiti*. 645. *Supra-spinatus*. 646. *Infra-spinatus*. 647. *Teres minor*. 648. *Teres major*. 649. *Triceps extensor cubiti*. 650. *Supra-spinatus*. 651. *Infra-spinatus*. 652. *Teres minor*. 653. *Teres major*. 654. *Triceps extensor cubiti*. 655. *Supra-spinatus*. 656. *Infra-spinatus*. 657. *Teres minor*. 658. *Teres major*. 659. *Triceps extensor cubiti*. 660. *Supra-spinatus*. 661. *Infra-spinatus*. 662. *Teres minor*. 663. *Teres major*. 664. *Triceps extensor cubiti*. 665. *Supra-spinatus*. 666. *Infra-spinatus*. 667. *Teres minor*. 668. *Teres major*. 669. *Triceps extensor cubiti*. 670. *Supra-spinatus*. 671. *Infra-spinatus*. 672. *Teres minor*. 673. *Teres major*. 674. *Triceps extensor cubiti*. 675. *Supra-spinatus*. 676. *Infra-spinatus*. 677. *Teres minor*. 678. *Teres 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a, *l*ongue. *g*, The *t*revis. *b*, A small portion of the third head, named *Brachialis Externus*. *i*, The tendon of *triceps*, inserted into the olecranon. *k*, Part of the *brachialis internus*. And *l*, *conarus*, which seems to be continued from that part of the *brachialis externus* immediately above it. *m*, *Extensor carpi radialis longior*; and beneath it the *brevior*; both are seen at the wrist, inserted into the metacarpal bones of the fore and middle fingers. *n*, *Flexor carpi ulnaris*. *o*, Part of the *supinator radii brevis*. *p*, *Extensor ossis metacarpi pollicis manus*. *q*, *Extensor primi internodii pollicis manus*. *r*, *Extensor secundi internodii pollicis manus*. *s*, *Indicator*, inserted into the root of the first joint of the fore finger. *t*, One of the three external *interossei manus*. The other two are distinctly seen without letters. *u*, One of the tendons of the *extensors* of the fingers cut; and the same is seen in each of the other three fingers, joining with the tendons and aponeuroses of the *interossei* and *lumbricales*, and spread upon the back of the fingers.

On the right hand, part of the *flexors* of the fingers, the *abductor pollicis*, and *minimi digiti*, are seen.

INFERIOR EXTREMITY. *a*, *Glutæus medius*. *b*, *Pyriformis*. *c*, The two muscles called *Gemini*, between which the tendon of the *obturator internus* passes over the tuberosity of the *os ischium*; and its fleshy belly is seen within the pelvis, partly covered by the *coccygæus* and *levator ani*. *d*, *Quadratus femoris*. *e*, *Vastus externus*. *f*, *f*, Parts of the *triceps magnus*. *g*, Long head of the *triceps flexor cruris*; and beneath it part of the short head is seen. *h*, *Semitendinosus*, and beneath it parts of the *semimembranosus* are seen on each side of it. *i*, *Gracilis*. *k*, A small portion of the *vastus internus*. *l*, *Popliteus*. *m*, The fleshy belly of the *plantaris*; and its long slender tendon is seen passing over the inside of the *soleus*. *n*, *Soleus*. *o*, The place where the tendon of the *gemellus* was cut off; but the flesh of the *soleus* runs further down. *p*, *Tendo achillis*, with the *plantaris*. *q*, *Peroneus longus*, passing at the outer ankle to the sole of the foot; beneath it, the *peroneus brevis* to the root of the metatarsal bone of the little toe; and between it and the *tendo achillis*, a portion of the *flexor longus digitorum pedis*. *r*, Tendons of the *extensor longus digitorum pedis*, with the *peroneus tertius*; and beneath these, the *extensor brevis digitorum pedis*. *s*, *Flexor brevis minimi digiti pedis*.

FIG. 2. Represents the SECOND LAYER of MUSCLES, on the ANTERIOR PART of the WHOLE BODY.

MUSCLES situated on the HEAD and NECK. *a*, *Corrugator supercilii*. *b*, *Temporalis*. *c*, *Masseter*. *d*, *Levator anguli oris*. *e*, *Buccinator*. *f*, *Orbicularis oris*. Opposite to the right ala nasi, is the portion of this muscle which *Albinus* names *Nasalis labii superioris*. *g*, *Depressor labii inferioris*. *h*, *Sterno-cleido-mastoideus*, which is seen below, arising from the sternum and clavicle, by two heads. *i*, *Sterno-hyoideus*. On the outside of it, the *omo-hyoideus*. Further out, a portion of the *hyo-thyroideus*. *k*, *Levator scapulae*.

TRUNK. *a*, *Subclavius*. *b*, *Pectoralis minor*.

c, *Serratus magnus*. *d*, *Rectus abdominis*, divided into several fleshy portions by its tendinous intersections. *e*, *Pyramidalis*. *f*, *Obliquus ascens internus*. *g*, *Spermatic cord*, with the origin of the *cremaster muscle*.

SUPERIOR EXTREMITY. *a*, *Biceps flexor cubiti*. *b*, Short head of the *biceps*. Beneath the upper part of it, a portion of the *coraco-brachialis*. Beneath the under part a portion of the *brachialis internus*. *c*, Long head of the *biceps*. At the bending of the arm, the tendon of the *biceps*, and the place where the tendinous aponeurosis was cut from it, are seen. *d*, *Extensor carpi radialis longior*. Beneath it a portion of the *extensor carpi radialis brevior*. *e*, *Flexor sublimis perforatus*. *f*, Insertion of the *extensor carpi ulnaris*. *g*, *Extensor of the thumb*. *h*, *Opponens pollicis*. On the inside of it, is a portion of the *flexor pollicis brevis*. *i*, Tendon of the *flexor longus pollicis manus*, after passing through the *flexor brevis pollicis manus*. *k*, *Abductor minimi digiti manus*. *l*, *Flexor parvus minimi digiti manus*. *m*, *Ligamentum carpi annulare*.

INFERIOR EXTREMITY. *a*, *Iliacus internus*. Between *a* and *b*, part of the *psoas magnus*. *b*, *Pectinalis*. *c*, *Triceps longus*. *d*, *Gracilis*. *e*, *Rectus cruris*, cut off near its origin. *f*, Tendon of the *rectus cruris* cut off above the patella, from which a strong tendon is sent to be inserted into the tubercle of the tibia. *g*, Portion of the *glutæus medius*. On the inside of it, is part of the *glutæus minimus*. *h*, *Vastus internus*. *i*, *Vastus externus*. *k*, *Crureus*. *l*, Insertion of the *biceps flexor cruris* into the fibula. *m*, Tendons of the *gracilis* and *semitendinosus* inserted into the tibia. *n*, *Soleus*. *o*, *Peroneus longus*. *p*, *Extensor longus digitorum*, with the *peroneus tertius* on the outside, and *extensor pollicis proprius* on the inside. *q*, *Soleus*. *r*, *Flexor longus digitorum*. *s*, Tendons of the *tibialis posterior* and *flexor longus digitorum pedis*. *t*, *Flexor brevis digitorum pedis*.

FIG. 3. MUSCLES and TENDONS of the INSIDE of the HAND.

1. *Musculus abductor pollicis*. 2. *Abductor pollicis*. 3. *Flexor brevis*. 4. *Quadratus palmaris brevis*. 5. The strong ligament of the carpus; that binds down the tendons of the *flexors* of the fingers. 6. *Abductor minimi digiti*. 7. A probe thrust under the tendons of the *perforans*. 8. A probe under those of the *perforans*. 9. *Lumbricales*. 10. *Perforatus*. 11. *Flexor carpi radialis*. 12. *Flexor carpi ulnaris*.

FIG. 4. MUSCLES and TENDONS of the FOOT.

1. *Tendo achillis*. 2. That part of the *astagalus* which articulates with the tibia. 3. Tendon of the *tibialis anticus*. 4. Tendon of the *extensor pollicis pedis longus*. 5. Tendons of the *extensor digitorum communis*. 6. *Extensor pollicis pedis brevis*. 7. *Extensor digitorum brevis*. 8. The union of the tendons of the *extensor longus* and the *extensor brevis*.

FIG. 5. A VIEW of the BLADDER and its APPENDAGES.

1. The under side of the bladder. 2. The rectum.

other at different distances, so as to form numerous interstices that communicate with each other. These interstices have been named *CELLULÆ*, and the substance they compose the *cellular membrane*. The thickness of the *membrana adiposa* is not the same all over the body. It adheres very closely to the skin, and runs in between the muscles, whose fibres it surrounds and connects. It is the bond of union between the various parts of the body and the membranes which contain them.

(237.) The *CELLULAR INTERSTICES* are so many little bags filled with *FAT*; and these we find plentifully deposited immediately under the skin, and filling up those interstices between the external muscles, which would otherwise have exhibited disagreeable hollow or void places. In some parts the fat serves for a cushion, as on the scrotum, where the laminae and cells are very numerous. Other parts have little or no fat; as the forehead, elbows, &c. The fat is likewise of great use to the muscles, in preserving their flexibility, and in lessening their mutual frictions. It may also be some defence against the cold, for we find it makes more impression on lean than on fat persons. This mass of fat, which makes an universal integument of the body, is different from that which is found in the abdomen, thorax, canal of the *spina dorsi*, articulations of the bones, and in the bones themselves. As to the difference existing between particular masses of fat in different parts, it consists chiefly in the thickness or fineness of the pellicle, in the largeness or smallness of the cells, and in the consistence of the contained matter.

SECT. III. Of the NAILS and HAIR.

(236.) To the nails and hair, we allot a separate section, as they cannot properly be classed among the common or general integuments, only particular parts of the body being covered with them. The *NAILS* are of a compact texture, hard and translucent like horn. Their origin is still a subject of dispute. Malpighi supposed them to be continued by a continuation of the papillae of the skin. Ludwig, on the other hand, maintained, that they were composed of the extremities of bloodvessels and nerves. Both these opinions are now universally rejected. They seem to possess many properties in common with the cuticle; for they are neither vascular nor sensible, and as the cuticle is separated from the true skin by exfoliation or other means, the nails come away with it. They appear to be composed of several layers, of unequal size, applied one on the other. Each layer seems to be formed of fibrous fibres.

(238.) In each nail we may distinguish three parts, viz. the root, the body, or middle, and the extremity. The root is a soft, thin, and white substance, terminating in the form of a crescent; the nail adheres very strongly to this part; the body of the nail is broader, redder, and thicker, and the extremity is of still greater firmness. The nails grow from their roots, and not from their extremities. Their principal use is to cover and defend the ends of the fingers and toes from external injury, and to enable us more nicely

ly to handle small objects, as well as to increase our power of grasping large bodies.

(237.) The *HAIRS*, which from their being generally known, do not seem to require any definition, arise from distinct capsules or bulbs seated in the cellular membrane under the skin. Some of these bulbs inclose several hairs. They may be observed at the roots of the hairs, which form the beard or whiskers of a cat. The hairs, like the nails, grow only from below, by a regular propulsion from their root, where they receive their nourishment. Their bulbs, when viewed with a microscope, are found to be of various shapes. In the head of the scrotum they are roundish; in the eye-brows they are oval; in the other parts of the body they are nearly of a cylindrical shape. Each bulb seems to consist of two membranes, between which there is a certain quantity of moisture. Within the bulb the hair separates into 3 or 4 fibrillae; the bodies of the hairs, which are the parts without the skin, vary in softness and colour according to the difference of climate, age, or temperament of body.

(238.) The hairs likewise differ from each other, and may not be improperly divided into two classes; one of which may include the hair of the head, chin, pubes, and axillae; and the other, the softer hairs, which are to be observed almost every where on the surface of the body in most people. The skin of many people, however, excepting on the places above-mentioned, is totally free of hair; and some individuals have not a single hair on their whole body—not even upon the head or eye-brows, who, notwithstanding, enjoy perfect health. We know of one such singular instance of a lady of considerable rank in life. The general use of hairs on the body does not seem to be absolutely determined. On the head, they doubtless serve for defence from injury, as well as to preserve and increase the heat. Hairs on the eye-brow and eye-lids, are destined for particular uses, which will be mentioned when those parts are described. See Part VIII.

SECT. IV. Of INSENSIBLE PERSPIRATION and SWEAT.

(239.) One of the most important offices of the skin is, to exhale moisture from the body, and to absorb vapours from the atmosphere. The skin is replete with small arteries, either coiled up into papillae, or passing directly through it, which afford a passage to the *INSENSIBLE PERSPIRATION*; and lest it should be collected, as is the case in some diseases, between the skin and the cuticle, there are pores in the cuticle corresponding with the exhaling vessels of the skin, through which it freely passes. In a living person, this exhalation is many ways demonstrable. A clean looking glass placed against the warm and naked skin, is quickly obscured by the moist vapour. In subterraneous caverns, where the air is more dense, it is evidently seen to fly off from the whole surface of the body, like a thick cloud.

(240.) When the motion of the blood is increased by heat or exercise, the small cutaneous pores, instead of an invisible vapour, discharge *SWEAT*, consisting of minute but visible drops. The parts most subject to sweat are the head, breasts, arm-pits, and foldings of the skin. There are

are many reasons for supposing, that the perspirable matter and sweat are discharged through the same kind of vessels, and that they differ only in the quantity of the matter, and the quickness of the evaporation. The nature and quality of the perspired matter may be investigated by experiments, and by considering its analogy to the pulmonary exhalation. What flies off from the lungs in this exhalation is chiefly water; and that the perspirable matter is also chiefly water, is demonstrated by its obscuring a glass, and by several other tests. The water of these vapours proceeds chiefly from what we drink, but it is also in part supplied from what is inhaled by the skin. The particular smell of the aliments taken into the stomach, may be sometimes plainly perceived in the fluids we perspire.

(241.) The QUANTITY of our perspired moisture is very great, whether we consider the extent of the organ by which it is separated, the abundance of vapours derived from the lungs only; or barely take a view of the experiments made by Sanctorius. This indefatigable physician calculated, that 5 pounds out of 8 of the aliment is discharged in a healthy person, by insensible perspiration alone, independent of visible sweat, and other excretions. In cold climates, the quantity perspired was found to be four and two sevenths out of eight. But the cutaneous exhalation is even much greater than this; as not only a quantity of the aliment is thrown off, but likewise what is added to the blood by inhalation, which entering, often in a very considerable quantity, is thus again expelled. But different dispositions of the air, and of the human body, cause great variations in these proportions. The difference of time after feeding also in some measure varies the quantity perspired; but in general it is most copious, when the greater part of the digested nourishment is conveyed into the blood. It is naturally diminished in sleep, even in warm climates; but it is increased by the heat of bed-clothes.

(242.) The uses of perspiration are, to free the blood from its redundant water, and to throw out those particles, which, by repeated circulation, have become excrementitious. Perspiration likewise qualifies and softens the cuticle, which is a necessary medium extended before the tender sensible papillæ of the skin. Haller contended, that besides the exhalent vessels before-mentioned, the skin is full of small vessels, which inhale or absorb thin vapours from the air. These he conceived to have been demonstrated by anatomical injections, which, if thin or watery, sweated through them as through the arteries. But according to later physiologists, absorption is performed solely by the lymphatic vessels. That absorption, however, does take place, is sufficiently proved by the operation of medicines pervading the air, or applied to the skin: but still more by the phenomena of some diseases, where a much greater quantity of urine has been discharged than the quantity of drink taken in.

(243.) These cutaneous vessels, both exhaling and inhaling, are capable of contraction and relaxation by the power of the nerves. This appears from the effect of the passions of the mind; which, if joyful, increase the circulation, and re-

lax the exhaling vessels, so as to yield easier to the impulse of the blood; from whence, with shortening of the nerves, there follows a redness, moisture, and turgescence of the skin. These passions, on the contrary, which are sorrowful, and retard the circulation, contract the exhaling vessels; as appears from the dryness and corrugation of the skin, after frights; and from a diarrhoea being caused by terror. The same affections tend to open and increase the power of the inhaling vessels, as variolous or pestilential contagion is more liable to be contracted by persons under the influence of fear.

(244.) A moderate and uniform perspiration is usually reckoned a sign of health, because it denotes a free pervious disposition of the vessels, and a complete digestion of the aliment. When it is diminished, it indicates either a constriction of the skin, a weakness of the heart, or an imperfect digestion. Moderate exercise increases perspiration considerably; as do also warm, watery, and vinous drinks, animal food of easy digestion, moderate warm atmosphere; and, a cheerful tranquil state of mind. But though the contrary of these either lessen or suppress perspiration, we do not find that the continuance of life depends on a scrupulous exactness in the quantity discharged, which is so easily increased or diminished by slight causes. When greatly or totally suppressed, however, it tends to produce diseases of that nature, which depends on the putrescent quality of the particles retained along with it.

SECT. V. *Of the MEMBRANES in GENERAL.*

(245.) Each distinct part of the body is covered and every cavity is lined with a single membrane, whose thickness and strength is as the bulk of the part it belongs to, and as the friction to which it is naturally exposed. Those membranes, that contain distinct parts, keep the parts they contain together, and render their surfaces smooth, and less subject to be lacerated by the actions of the body; and those which line cavities serve to render the cavities smooth, and fit for the parts that contain to move against.

(246.) The membranes of all the cavities that contain solid parts, are either beset with glands, or provided with vessels, which secrete a fluid mucus, calculated to make the contained parts move freely against each other, and prevent their growing together; and those cavities which are exposed to the air, as the nose, ears, mouth, and trachea, have in their membranes numerous little glands which separate a mucus thick enough to defend them from the action of the air in respiration. Those membranes that have distinguishing names, and deserve a particular description, will be treated of as occasion may require.

SECT. VI. ADENOLOGY: *Of the GLANDS in GENERAL.*

(247.) A GLAND is a small round or oval body, chiefly composed of a convolution of one or more arteries of a considerable length, from whose sides arise a vast number of excretory ducts. But the larger secretions are made by visible glands, yet unconvolved arteries may also have excretory ducts for the same purpose. In this way probal
secreti

large reddish mass, covering the anterior convex side of the larynx. It seems to be made up of 2 oblong glandular portions united by their inferior extremities, below the cricoid cartilage, in such a manner as to have some resemblance to a crescent, with the cornua turned upward. The 2 lateral portions lie on the muscoli thyroidei, and the middle or inferior portion on the crico-thyroidæi. This gland seems to be of the same kind with the other salival glands, but is more solid. It is formed of glandulous grains, and of vesicles of different sizes, full of a yellowish oily liquor, which may serve to lubricate the parts in its neighbourhood.

(262.) Secretion being very much promoted by pressure upon the surface of a gland, the salival glands are so seated as to be pressed by the lower jaw, and its muscles, which chiefly happens at those times when the fluid is wanted. The force too with which the jaw must be moved, being in proportion to the dryness and hardness of the food masticated, the secretion from the glands depends very much upon the exertion of that force. All food requires to be reduced to a pulp, and mixed with saliva before it can be fitted for digestion; therefore the drier and harder foods, needing more of this secretion, will, from this mechanism, be supplied with more of it than moister foods, in that proportion in which they are drier and harder. What quantity of saliva these glands can separate from the blood, in a given time, is not easy to determine, but we all know from experience how freely they act when necessity requires.

(263.) The THYMUS is a conglobate gland, the use of which is not perfectly ascertained, its excretory duct not having yet been discovered. It is of an oblong figure, and is larger in the fœtus and in young children than in adults, being sometimes nearly effaced in very old subjects. It is placed in the upper part of the thorax, between the two laminæ of the mediastinum; but at first is not altogether contained within the cavity of the chest, being found to border upon the upper extremity of the sternum.

PART IV. SPLANCHNOLOGY.

SECT. I. Of the ABDOMEN, and its GENERAL CONTENTS.

(264.) Although SPLANCHNOLOGY, in the strict meaning of the word, respects only the bowels or contents of the abdomen, yet it would be improper to describe the particular viscera, without first taking notice of the great cavity which contains them.

(265.) The ABDOMEN, or LOWER BELLY, as it is commonly styled by anatomists, (although none of them ever speaks of an *upper* one) extends from the lower extremity of the sternum, or the hollow, usually called *scrobiculus cordis* or the *pit* of the stomach; to the lower part of the trunk. It consists of three divisions, called *regions*; viz. the *epigastric*, the *umbilical* and the *hypogastric*.

(266.) The EPIGASTRIC REGION, begins immediately under the sternum, and extends to within two fingers breadths of the navel; where the middle or *umbilical region* begins, and reaches to the same distance below the navel. The *hypo-*

gastric, includes the rest of the abdomen, as as the *os pubis*. Each of these regions is subdivided into three others; two of which comprise the sides, and the other the middle part of each region.

(267.) The middle part of the upper region called *epigastrium*, and its two sides *hypochondria*. The middle part of the next region, the *umbilical region*, properly so called, and its two sides, are the flanks, or *iliac regions*. Lastly, the middle part of the lower region retains the name of *hypogastrium*, and its sides are called *inguina* or groins. The back part of the abdomen bears the name *lumbar region*. These are the divisions of the lower belly, which ought to be remembered, they frequently occur in surgical and anatomical writings. We will now proceed to the contents of the abdomen; and after mentioning the several viscera contained in it, with their relative situations, describe each of them separately.

(268.) When the skin, adipose membrane, and abdominal muscles are removed, we discover the peritonæum or membrane that envelopes all the viscera of the lower belly. Upon opening the peritonæum, the first part that presents is theomentum or cawl, floating on the surface of the intestines, which are likewise seen every where loose and moist, and making a great number of circumvolutions through the whole cavity of the abdomen. The stomach is placed in the *epigastrium*, and under the stomach is the pancreas. The liver fills the right *hypochondrium*, and the spleen is situated in the left. The kidneys are situated about the middle of the *lumbar region*, and the urinary bladder and parts of generation are seated in the lower division of the abdomen.

SECT. II. Of the PERITONÆUM and OMENTUM.

(269.) I. The PERITONÆUM is a strong membrane which lines the whole cavity of the abdomen, and envelopes and partly supports the liver, spleen, omentum, stomach, intestines, and rectum, with all their vessels and glands. Its superior portion of it extends over that part of the diaphragm, which constitutes a part of the cavity of the abdomen. It may be considered as a single membrane, though described by many anatomists as a duplicature of two distinct membranous laminæ. Its inner substance is very smooth and polished on that side which is next the viscera, and it is continually moistened by a serous fluid, discharged through almost imperceptible pores opening chiefly from the exhalent vessels. The cellular substance, or external portion of the peritonæum, adheres very closely to the parts which form the insides of the cavity of the abdomen, but it is not every where of an equal thickness. Those great blood vessels, the aorta and vena cava, are involved in this cellular substance of the peritonæum. Indeed, it involves immediately and separately, all the parts and organs, which are commonly said to lie in the duplicature of the peritonæum.

(270.) The principal uses of the peritonæum are very evident. It serves to line the cavity of the abdomen, to invest the viscera contained in that cavity as in a common bag, to supply them with particular coats, and to form passages for the ducts of the secretory vessels.

obliquely backwards toward the upper orifice; so that the pylorus lies about two fingers breadth from the body of the vertebræ immediately under the small portion of the liver.

(281.) The stomach is composed of 4 tunics or coats, so intimately connected together that it requires no little dexterity in the anatomist to demonstrate them. The exterior one is membranous, being derived from the peritonæum.—The 2d is a muscular tunic, composed of fleshy fibres which are in the greatest number about the two orifices. The 3d is called the nervous coat, and within this is the villous or velvet-like coat, which composes the inside of the stomach. The two last coats being more extensive than the two first, form the folds, which are observed every where in the cavity of this viscus, and more particularly about the pylorus; where they seem to impede the too hasty exclusion of the aliment, making a considerable plait, called *valvula pylori*. The inner coat is constantly moistened by a mucus, which approaches to the nature of the saliva, and is called the gastric juice; this liquor has been supposed to be secreted by certain minute glands seated in the nervous tunic, whose excretory ducts open the surface of the villous coat.

(282.) Here it is proper to take notice of that important operation of the stomach, called DIGESTION. By this term is understood, the changes our aliment undergoes for the formation of chyle. The manner in which this is performed has been matter of great controversy. The different doctrines of fermentation, attrition, and solution by heat, as in the machine called Papin's Digester, have given way to more rational opinions. The experiments of the Abbe Spallanzani and Mr Hunter uniformly prove that digestion is not effected by any fermenting power, by contractions of the stomach, or by heat; but by a peculiar fluid secreted in the coats of the stomach, called the GASTRIC juice. This is poured into the cavity, and there animalizes the food, or assimilates it to the nature of blood. It has also appeared that animals, or parts of animals, possessed of the living principle, when taken into the stomach, are not in the least affected by the action of that viscus; but the moment they lose the living principle, they become subject to its digestive powers. This seems to be the case with the stomach, which is enabled to resist the action of its juices in the living body; but when deprived of the living principle, it is then no longer able to resist the powers of that menstruum, which it had itself formed for the digestion of its contents; the process of digestion appearing to be continued after death; so that the inner coat of the stomach itself is eroded.

(283.) After having been sufficiently divided by mastication, and mixed with saliva in the mouth, the food enters into the stomach, where it is thoroughly blended with the gastric juice. Here it is capable also of irritating the inner coat of the stomach to a certain degree, and occasioning a contraction of its two orifices. In this membranous bag, surrounded by the abdominal viscera, and with a certain degree of natural heat, the contents of the stomach undergo a constant agitation by means of the abdominal muscles and

of the diaphragm, and likewise by a certain contraction or expansion of the muscular fibres of the stomach itself. By this motion, every part of the food is exposed to the action of the gastric juice, which gradually divides and attenuates, and prepares it for its passage into the intestines.

(284.) After the food has remained from one to three hours in the stomach, it is converted into a greyish pulp, called *chymus*, and some few small particles begin to appear. The time of its residence in this bag is proportioned to the nature of the aliment, and the state of the stomach and its juices. The thinner and more perfectly digested parts pass by a little at time into the duodenum; while the grosser and less digested particles remain in the stomach, till they acquire a sufficient degree of fluidity to pass into the intestine, where the nature of this pulp is perfectly changed. The bile and pancreatic juice which flow into the duodenum, and the mucus, which is every where distilled from the surface of the intestines, mingle with the ejected matter, and farther attenuate and dissolve it.

(285.) Two substances, very different from each other in their nature and destination, are the result of this combination. One of them is composed of the liquid parts of the aliment, and of some of its more solid particles, extremely divided and mixed with the juices we have described, constitutes a very mild, sweet and whitish fluid, resembling milk, and distinguished by the name of *chyle*. This fluid is absorbed by the lacteal vessels, which convey it into the circulation, where, by being assimilated to the nature of blood, it affords that supply of nutrition, which the continual waste of the body requires. The other is the remains of the alimentary mass, deprived of all its nutritious particles, and containing only such parts as were rejected by the absorbing mouths of the lacteals. This grosser part, called the *feces*, passes on through the course of the intestines, and is voided at the anus.

(286.) The INTESTINAL CANAL is 5 or 6 times as long as the body, and forms many circuitous lutions in the cavity of the abdomen, which traverses from the right to the left, and again from the left to the right; in one place descending, and in another extending itself upwards. The inner coats of the intestines, being more capacious than their exterior tunics, form a multitude of plaits, placed at certain distances, called *valvule conniventes*. Now this disposition will be found to afford a farther proof of the divine wisdom, which the anatomist and physiologist may discover in all their pursuits.—For if the intestinal canal was much shorter than it naturally is, if it passed in a direct course from the stomach and if its inner surface was destitute of valvules, the aliment would pass with great rapidity to the anus, and sufficient time would be wanting to assimilate the chyle, and absorb it into the lacteals; so that the body would be deprived of its supply of nutrition, which is so essential to life and health.

(287.) The intestinal canal is divided into small and large intestines; the former being distinguished by the names of duodenum, jejunum, &c.

SECT. IV. Of the MESENTERY, LIVER, GALL-BLADDER, PANCREAS, and SPLEEN.

(297.) I. The great bundle of intestines, described in last section, is not left to move at random in the cavity of the abdomen; but is carefully bound down by a membranous web, which prevents the intestinal convolutions from being entangled in each other, and yet allows them a gentle, floating, but limited motion.—This web, which is called the MESENTERY, is distinguished into two portions; one very broad, and much plaited, which connects the small intestines; the other, long and incurvated, which does the same to the large ones. But in fact these two portions consist only of the membranous-laminae of the peritonæum doubled back upon itself, after having enclosed the intestines, and are distinguished only by their breadth. Taken both together, they form a kind of spiral roll, more or less plaited in its circumference. The first portion, which accompanies the small intestines, has retained the name of *mesentery*; those parts of it, which are attached to the colon and rectum, are called *mesocolon* and *mesorectum*. Between these laminae there are numerous blood vessels, many nervous filaments, and an infinite number of small vessels called *lymphatics*, of which afterwards.

(298.) The mesentery is attached to the lumbar vertebrae, which serves to keep the intestines in their natural situation. The idea usually formed of the colic, called *miserere*, is perfectly erroneous; it being impossible that the intestines can be *twisted*, as many suppose that they are, in that disease, their attachment to the mesentery effectually preventing such an accident—but a disarrangement sometimes takes place in the intestinal canal itself, which is productive of disagreeable, and sometimes fatal consequences.—This is by an intorsion of the intestine, an idea of which may be easily formed, by taking the finger of a glove, and involving one part of it within the other. If inflammation takes place, the stricture in this case is increased, and the peristaltic motion of the intestines, *i. e.* the progressive motion of the faeces downwards, is inverted, and what is called the *ilic passion* follows. The same effects may be occasioned by the descent of the intestine, or of the omentum; either with it or by itself, and thus constituting what is called an *hernia* or *rupture*; a term by which in general is meant the falling down or protrusion of any part of the intestine, or omentum, which ought naturally to be contained within the cavity of the belly.

(299.) II. The LIVER is the largest gland in the body; and its colour is that of a dusky or brown red. It is situated immediately under the diaphragm in the right hypochondrium. Its exterior side is convex, and interior concave. Backward towards the ribs it is thick, and thin on its fore part, where it covers the upper side of the stomach, and some of the intestines. The upper side of it is connected with the diaphragm, being also tied to that and the sternum by a thin ligament, which is described commonly as two; the upper portion being named *suspensorium*, and the anterior *latum*: But either of these names is suf-

ficient for the whole. It is also tied to the navel by a round ligament called *teres* or *umbilical*, which is merely the umbilical vein of the foetus condensed into a ligament, and which is inserted into the liver at a small fissure in its lower edge. The ligamentum latum or suspensorium, sustains the liver in an erect posture, or rather fixes its situation, while it is supported by the other viscera, they being compressed by the abdominal muscles. When we are placed in an horizontal posture, the *teres* prevents it from pressing on the diaphragm; and in lying on the back they both together suspend it, that it may not compress and obstruct the ascending vena cava. It is supplied with blood by the branches of the celiac and mesenteric arteries, called, in this viscus, *arteriae hepaticae*; but its blood vessels, that compose it as a gland, are the branches of the vena porta, which enters the liver, and distributes blood like an artery, to have the bile secreted from it; and the branches of the cava in the liver, which return the redundant blood into the cava ascendens. It has also several branches of nerves, and a great number of lymphatics. The quadrupeds, that have a great deal of motion in their backs, have their livers divided into many distinct lobules; which, by yielding to each other, obey those motions, without any danger of laceration.

(300.) III. The GALL-BLADDER is a receptacle for the bile, seated upon the inferior and concave surface of the liver. It is shaped like a pear, composed of one dense and somewhat muscled coat, which is covered with peritonæum like that of the liver. It is also lined with another membrane that cannot easily be separated, making three coats in the whole. From the gall-bladder towards the duodenum runs a duct called *cysticus*, and from the liver to this duct, one called *hepaticus*, which carries off the gall this way, when the gall-bladder is full. The ductus cysticus and hepaticus being then united and forming one common channel, commence *ductus communis choleducus*, which enters the duodenum obliquely at a distance of a few inches below its commencement. The orifice of this duct in the gut is somewhat eminent, and is situated above the surface, but has no caruncle as has been described by some. As the liver, by its situation in the same cavity with the stomach, will be most pressed, and consequently secrete most gall where the stomach is fullest, namely at the time when it is most wanted; so the gall-bladder, lying next the duodenum, will have the fluid pressed out by the aliment passing through that gut, and consequently at a right time a due proportion; because the greater the quantity of aliment is, the greater will be the compression; and *vice versa*. A chemical analysis of bile, and experiments of its mixture with various substances, demonstrate, that it contains a portion of water, and a considerable quantity of inflammable oil, which appears very evident from the gall stones. The bile, therefore, is a kind of soap; but of that sort which is made from a volatile saline lixivium, mixed with oil and water. This, therefore, being intermixed with the aliment, reduced to a pulp, and slowly expelled from the stomach, by the peristaltic force

duod

duodenum and pressure of the abdominal muscles incorporate them all together; and the acid and alkali qualities of the food are in some measure thus corrected. The curd of milk is also dissolved by it into a liquid, and the whole mass of chyle is inclined more to a putrid alkalescent disposition. It dissolves the oily matters, so that they may freely incorporate with the watery parts and make up an uniform mass of chyle to be sent to the lacteals; the surrounding mucus in the intestines is thereby absterged and attenuated, and the peristaltic motion is excited by its acrimony; all which offices are confirmed, by observing the contrary effects from a want or defect of the necessary fluid. The bile descends slowly along with the alimentary mass; and having spent its force, most of it is afterwards excluded with the feces; but probably some of the more subtle, watery, and less bitter parts, are again taken up by the absorbents.

SECT. IV. The PANCREAS, or *sweet-bread*, as it is vulgarly called, is a large conglomerate gland of the salivary kind, lying across the upper and anterior part of the abdomen, near the duodenum. It has a short excretory duct, about half as large as a goose quill, though it is commonly painted as the ductus communis choledochus. It enters the duodenum together with the bile duct, but in dogs at some distance from it; and for the most part, in two ducts at a distance from one another. The fluids of this gland, together with the bile, help to complete the digestion of the aliment, and render it fit to be taken up by the lacteal vessels. Winslow has also observed, that, where the great extremity of the pancreas is connected to the curvature of the duodenum, it sends down an elongation, which adheres very closely to the following portion of the intestine; and, upon a careful examination, he has found a particular pancreatic duct ramified like the biliary one, which ran toward and intersected the bile duct, into the extremity of which it entered after having perforated the duodenum. In dissection he termed *pancreas minus*. It sometimes opens separately into the duodenum, in which case we likewise observe several small holes round the ductus choledochus, which answer to the pancreatic duct.

SECT. V. The LIEN, or *spleen*, is seated in the hypochondrium, immediately under the diaphragm, and above the kidney, between the stomach and the ribs. It is supported by the surrounding parts, and fixed to its place by an adhesion to the peritoneum and diaphragm. It also has a point of attachment to the omentum, which has been already observed. The figure of it is that of a depressed oval, near twice as long as broad, and almost twice as broad as thick. Sometimes it is divided into lobules, but for the most part it has only one or two small fissures on its edge, and sometimes none. In its colour it resembles iron. The inner texture, in brutes, is vesicular, like the penis, and contains grumous blood, and also small bodies like glands; but Ruysch denies that the human spleen is of the same texture. The spleen has often been removed from dogs without any remarkable inconvenience to them. Mr Cheselden speaks of having seen in the human subject,

2, & 3, and in one instance 4 spleens. Some of these, though small, differed from each other in size; others were nearly equal in bulk, but the whole together, in any one of these subjects, would not amount in size to more than a spleen of ordinary dimensions. The want of an excretory duct to this viscus has occasioned the use of it to be doubtful and controverted. Anatomists indeed have gone no further than to conjecture, that it may prepare the blood for supplying a sort of watery juice, (probably of a subalkaline nature and rendered somewhat sharp by the remora of the blood,) to the bile.

SECT. V. Of the KIDNEYS, URETERS, URINARY BLADDER, and GLANDULÆ RENALES.

(303.) I. The KIDNEYS in the human subject greatly resemble those of the hog; and weigh about 12 ounces. They are seated towards the upper part of the loins upon the two last ribs; the right under the liver, and a little lower than the other, and the left under the spleen. Their use is to secrete the urine from the blood, which is brought thither for that purpose by the emulgent arteries; and what remains, after the functions of the gland have been performed, is returned by the emulgent veins, while the urine secreted is carried through the ureters into the bladder.

(304.) II. The URETERS are two tubes, each of them about the bigness of a goose quill, and about a foot long. They arise from the indented side of the kidneys, and end in the bladder near its neck, running obliquely for the space of an inch between its coats, by which mode of entering, their extremities form a kind of valves. The beginning of the ureters in the kidneys are the *tubuli urinarii*, which joining together from the pelvis in each kidney. Between the *tubuli urinarii*, authors have remarked small papillæ; and the parts which are distinguished by a clearer colour are called *glandulæ*.

(305.) III. The URINARY BLADDER is seated in a duplicature of the peritonæum in the lower part of the pelvis of the abdomen. Its shape is orbicular, and its coats are the same with those of the intestines and other hollow muscles already described; viz. the external membranous, the middle muscular, which is the *musculus detractor urinae*, and the inner a membranous coat, exceedingly sensible, as is well known to those who have the stone, or are troubled with the gravel. The use of this nice sense is to make it capable of that uneasiness, which excites animals to exclude their water, when the bladder is distended. This sense indeed is naturally so delicate, that no fluid but healthy urine can be long endured; even pale urine, or urine with matter in it, in a degree excites the symptoms of the stone, and forces the patient to evacuate the bladder. Some writers have supposed the existence of a short passage for fluids into the bladder, from the copious and speedy evacuations of pale urine, which succeed the drinking of weak intoxicating liquors, of mineral waters, &c. But the fact is, that there does not seem to be any other way for the urine to pass, than that by the kidneys and along the course of the ureters. For the bladder is, on all sides

sides, separated from the cavity of the abdomen by the peritonæum; nor is it probable that the vapours, which either go out from the bladder, or which are derived towards it from other parts, can here find open pores through the peritonæum. The bladder may be so distended with urine as to produce death; yet, in these cases, we never observe that the urine has found any passage, through which it might escape into the pelvis. Again, when the ureters are obstructed with stones, so that the bladder receives nothing from them, it is either quite empty, or contains a very acrimonious and thick urine, manifestly indicating that the water can find no other way from the kidney into the bladder. A careful attention, indeed, to the manner in which mineral waters are discharged by urine, sufficiently demonstrates that there is no such rapidity therein as is commonly imagined; but the stimulus of the cold water received into the stomach, like the external cold applied to the skin, causes a concussion of the bladder and urinary parts, by which they are solicited to repeated discharges of the old urine, which was before in the body, and not immediately of that which was last drunk. Again, the largeness of the renal vessels demonstrates, that they cannot receive much less than an 8th part of the blood of the whole body at a time, and consequently above 1000 ounces of blood are conveyed through the kidneys in an hour; and it will appear but a moderate allowance for 20 or even 50 ounces of water to distil from that quantity of blood in the same time. Finally, it is certain, that both men and brutes perish if the ureters are obstructed; and in such cases, we observe, that no urine passes to the bladder.

(306.) IV. The GLANDULÆ RENALES are two glands seated immediately above the kidneys, of no certain figure, nor do we know their use; but anatomists always describe them along with the urinary parts, because of their situation. In a very young foetus they are larger than the kidneys, and in an adult but a little larger than in the foetus. They receive a great many small arteries, and return each of them one or two veins. In their inside is a small sinus, tinged with a sooty coloured liquor.

SECT. VI. Of the MALE GENERATIVE ORGANS.

(307.) The male organs of generation are partly situated within and partly without the abdomen. They have been usually divided into the parts which serve to prepare the semen from the blood, and those which are destined to convey it into the womb. But it seems more proper to distinguish them into the *preparing*, the *containing*, and the *expelling* parts, which are the different offices of the *testes*, the *vesiculæ seminales*, and the *penis*.

(308.) I. The TESTES are two glandular bodies seated in a loose external membranous bag called the *scrotum*. Their office is to separate the semen from the blood. They are said to have four coats, two common and two proper. The common are the outer skin, and a loose membrane or muscle immediately underneath, called *dartos*. The first of the proper is the *tunica vaginalis*. It is continued from the peritonæum to the testicle, which it incloses with all its vessels, but is divided by

an adhesion or *septum* immediately above the testicle; so that no fluids can pass out of that part of this membrane, which incloses the testicle. The other proper coat is the *tunica albuginea*, which is very strong, and which immediately invests the testicles. The testes receive each an artery from the aorta, a little below the emulgent vessels. These, unlike all other arteries, arise small and dilate in their progress, that the velocity of the blood may be sufficiently abated, for the secretion of so viscid a fluid as the semen. The right testicle returns its vein into the cava, and the left into the emulgent vein on the same side, both because it is the readiest course, and because, as authors say, this spermatic vein would have been obstructed by the pulse of the aorta, if it had crossed that vessel to go to the cava. On the upper part of the testicles, are hard bodies called *epididymi*; which are evidently formed of the *vasa deferentia*. They may without difficulty be unravelled backward, in single vessels, and then into more and smaller, like the excretory vessels of some other glands.

(309.) II. The VASA DEFERENTIA are excretory ducts to carry the secreted semen into the *vesiculæ seminales*. They pass from the epididymi of the testicles, along with the blood-vessels, till they have entered the muscles of the abdomen; and then they pass under the peritonæum, directly through the pelvis, to the *vesiculæ seminales*.

(310.) III. The VESICULÆ SEMINALES are two bodies that appear like irregular vesicles. They are seated under the bladder near its neck. They may be each of them unfolded into one single duct, which discharges into the urethra, by the sides of the *caput galinaginis*, which is an eminence in the under side of the urethra near the neck of the bladder. In these vesicles or ducts the semen is deposited preparatory to the time of coition; but in dogs there are no *vesiculæ seminales*, therefore nature has given them a large bulb in the penis, which keeps them compressed seemingly against their inclination, till the semen can be secreted and emitted into the uterus of the female. The semen passes from these *vesiculæ seminales* in time of coition, through prostrate glands into the urethra, and is thence emitted.

(311.) IV. The GLANDULÆ PROSTATÆ are two glands, or rather one, about the size of a nutmeg. They lie between the *vesiculæ seminales* and penis, under the ossa pubis, almost within the pelvis. They separate a limpid glutinous humour which is carried into the urethra by several ducts, that enter near those of the prostatæ. The liquor seems designed to be mixed with the semen in the time of coition, in order to make it flow more easily through two short passages, which open into the urethra close to a little eminence called *verumontanum*.

(312.) V. The PENIS is the vehicle or active organ of procreation. It is composed of two columns, the *corpora cavernosa* and *corpus spongiosum*. The former, which constitute the greatest part of the penis, are two cylindrical ligamentous tubes composed of minute cells of a spongy texture, which communicate with each other. These two bodies are of a very pliant texture, and capable of considerable distension; and being united laterally to

[illegible]

runula muriformes; and in the latter, the organa, with the uterus, and the parts connected with it.

(379.) I. The Mons veneris is that considerable piling of fat which is covered with hair, and situated where the *fofsa magis* upon the os pubis. The great doubling of the skin, on each side the rim, forms the *labia*; and within these there is a lesser doubling, named *nymphae*. These help to close up the orifice of the vagina; and also answer certain useful purposes in parturition.

(23.) If the CLITORIS is a small spongy body, bearing some slight analogy and resemblance to the penis in men, but it has no profligacy.—It begins with two currs from the ossa ischia, and uniting under the ossa pubis, it proceeds to the upper part of the nymphæ, where it ends under a small doubling of skin, called perineum: the end which is thus covered, is called glans. This part has been supposed the chief seat of a woman's pleasure in coition, as the glans penis is in men, but this is somewhat doubtful. A little below the clitoris, just within the vagina, is the exit of the urethra urinaria, which forms a small orifice or nipple.

(329.) III. The VAGINA is seated between the bladder and rectum. The texture of it is membranous, and its orifice is contracted by muscles, which act like a sphincter, yet the posterior extremity of it is sufficiently capacious. The inner or posterior extremity of this great canal furnishes the orifice of the uterus, a little obliquely, in such a manner as that the upper side of the canal lies very near the orifice, and the lower side at a greater distance from it, and this makes the extremity of the uterus appear to advance more into the canal, on the lower than on the upper part.

(370.) IV. The anterior extremity of the vagina in virgins, and especially before the menses appear, is commonly bordered by *circuli membranacei*, or circular membranous folds, more or less smooth, and sometimes fissuliculi which, in former times, were supposed to be the same as the hymen, but in others, a separate and in all, renders the external orifice narrower than the rest of the cavity. This fold, called *hymen*, (from the $\kappa\omicron\iota$ of marriage), is formed by the union of the internal membrane of the great canal, with that on the inside of the alae, and constitutes a membranous circle of different breadth, and sometimes: uncrura. This membranous circle is ruptured a little; quite lost in delivery, and in the case of a virgin, a small part of it remains; which, from their supposed resemblance to myrtle leaves, have been termed *carunculae myrtilliferae*.

(321.) V. The Uterus is seated at the termination of the vagina. In the virgin state, it is about one inch thick, two broad, and large enough to contain the kernel of an nut; but in women, that have had children, it is larger. Its orifice into the vagina is called a *fundus*, from the resemblance it bears to a tench's mouth. It has two round ligaments which go from the sides of it to the groins, through the oblique and transverse muscles of the abdomen, in the same manner as the femoral vessels in men. It is by this way that the gut passes, in a hernia intestinale in women.

women. Near these are the *ligamenta lata*, which are nothing more than a duplicature of the peritonæum.

(322.) VI. Near the sides of the uterus, and attached to the ligaments, are two bodies, called *OVARIA*. These are of a depressed oval figure, about half the size of men's testicles, and have spermatic vessels. They contain small pellucid eggs, from which circumstance they take their name. There are two arteries and two veins which pass to and from these ovaries or testes, in the same manner that they do in men; but make many more windings, and the arteries dilate more suddenly, in proportion as they are shorter.—These arteries and veins detach branches into the uterus and fallopian tubes, and not only form communications between the artery and vein on one side and those of the other, but also with the proper vessels of the uterus, which are detached from the internal iliac arteries and veins. From the minute branches of these vessels within the uterus, the menstrual evacuations are performed.

(323.) VII. The *FALLOPIAN TUBES*, (so named from Fallopius, who first discovered them) are two flaccid, conical, and vermiform canals, situated transversely on each side of the uterus, between the fundus and the lateral parts of the pelvis, and included in the anterior duplicatures of the *ligamenta lata*. Each of them is fixed by its narrow extremities in the corner of the fundus uteri, into which it opens, though by so narrow a duct as hardly to admit a large bristle. From thence their diameter augments by degrees all the way to the other extremity, where it is about one third of an inch. The body of each tube goes in a winding course, and its large extremity is bent towards the ovaria. These large extremities terminate by a narrow orifice, a little plaited and turned toward the ovarium, where it presently expands in the form of a membranous fringe, called *fimbria*, or *morfus diaboli*, whose office is to receive the ovum in the time of coition, and convey it into the uterus through the fallopian tubes.

SECT. VIII. Of CONCEPTION, and of the FOETUS IN UTERO.

(324.) I. The subjects of CONCEPTION and GENERATION have employed the philosophical world in all ages: but in following nature up to her minute recesses, the philosopher soon finds himself bewildered, and his imagination often supplies that which he so eagerly wishes to discover, but which is destined perhaps never to be revealed to him. Of the many theories which have been formed on this subject, that of the ancient philosophers seems to have been the most simple: they considered the male semen as alone capable of forming the foetus, and believed that the female only afforded it a lodging in the womb, and supplied it with nourishment after it was perfectly formed.

(325.) This opinion, however, soon gave place to another, in which the female was allowed a more considerable share in conception. This second system considered the foetus as being formed by the mixture of the seminal liquor of both sexes, in an arrangement of its several particles

in the uterus. But in the 16th century, vesicles or eggs were discovered in the ovaria or female testicles; the foetus had been found sometimes in the abdomen, and sometimes in the Fallopian tubes; and the two former opinions were exploded in favour of a new doctrine. The ovaria were compared to a bunch of grapes, being supposed to consist of vesicles, each of which had a stalk; so that it might be disengaged without hurting the rest, or spilling the liquor it contained. Each vesicle was said to include a little animal, almost complete in all its parts; and the vapour of the male semen being conveyed to the ovarium, was supposed to produce a fermentation in the vesicle, which approached the nearest to maturity; and thus inducing it to disengage itself from the ovarium, it passed into the tube Fallopianæ, thro' which it was conveyed to the uterus. Here it was supposed to take root like a vegetable seed, and to form, with the vessels originating from the uterus, what is called the *placenta*; by means of which the circulation is carried on between the mother and the foetus.

(326.) This hypothesis, with all its absurdities, continued to be almost universally adopted till the close of the same century, when Lieuwenhoeck, by means of his glasses, discovered certain opaque particles, which he described as so many animalcula, floating in the seminal fluid of the male. This discovery introduced a new schism among the philosophers of that time, and gave rise to a system which is not yet entirely exploded. According to this theory, the male semen passing into the tube Fallopianæ, one of the animalcula penetrates into the substance of the ovarium, and enters into one of its vesicles or ova. This impregnated ovum is then squeezed from its husk, thro' the coats of the ovarium, and being seized by the fimbriae, is conducted through the tube to the uterus, where it is nourished till it arrives at a state of perfection.

(327.) In this system there is much ingenuity; but there are certain circumstances supposed to take place, which have been hitherto inexplicable. M. Buffon has endeavoured to restore, the most ancient opinion, by allowing the female semen a share in this office; asserting, that animalcula or organic particles are to be discovered in the seminal liquor of both sexes. He derives the female semen from the ovaria, and he contends that no ovum exists in those parts. But in this idea he is evidently mistaken; and the opinion now most generally adopted is, that an impregnation of the ovum, by the influence of the male semen, is essential to conception. Of this, indeed, there can be no doubt; but as the manner in which such impregnation is supposed to take place, and the means by which the ovum afterwards gets into the Fallopian tube, and from thence into the uterus, are still accounted for chiefly by conjecture, we will not attempt to extend farther the investigation of a subject, concerning which so little can be advanced with certainty.

(328.) II. In treating of the FOETUS IN UTERO, which, till the human figure can be distinctly perceived, is only stiled *Embryo*, we cannot help recollecting the observation of the poet,

leculæ already mentioned; all of them being closely surrounded by two membranes continued from the pelliculæ. The innermost of these two membranes, which is in a manner the basis of the body of the mamma, is thick, and almost flat, adhering to the musculus pectoralis major. The second, or external membrane, is thinner, forming a particular integument for the body of the mamma, more or less convex, and adhering closely to the skin.

(339.) III. The CORPUS ADIPOSUM of the mamma, in particular, is a spongy cluster, more or less interlarded with fat, or a collection of membranous pelliculæ, which, by the particular disposition of their outer sides, form a kind of membrane in shape of a bag, in which all the rest of the corpus adiposum is contained. The anterior or outer portion of this bag, or that which touches the skin, is very thin; but that side next the pectoralis major is thick.

(340.) IV. The glandular body contains a white mass, which is merely a collection of membranous ducts, narrow at their origin, broad in the middle, and which contract again as they approach the papilla, near which they were supposed by some to form a circle of communication; but, from the observations of the latest anatomists, the ducts have little or no communication with each other at this place. They are named *ductus lactiferi*; and, in their course, are accompanied by a ligamentous elastic substance, which terminates with them in the nipple. Both this substance, and the ducts it contains, are capable of considerable extension and contraction; but, in their natural state, they are moderately corrugated, so as to prevent an involuntary flow of milk, unless the distending force be very great, from the accumulation of too great a quantity.

(341.) V. The AREOLA, i. e. the coloured circle, or disk, already mentioned, is formed by the skin; the inner surface of which sustains a great number of small glandular moleculæ, of that kind which Morgagni calls *glandule sebaceæ*. They appear very plainly all over the areola, even on the outside, where they form little flat heights or eminences, at different distances, quite round the circle. These tubercles are perforated by small holes, through which a kind of sebaceous matter, more or less liquid, is poured out, to defend the areola and nipple. Sometimes one or more of the lactiferous ducts have been found to terminate upon the surface of the areola. Hence Morgagni was led to think that the glands there are of the lactiferous kind.

(342.) VI. The tubercle which lies in the centre of the areola, is termed PAPILLA, or the nipple. It is of different sizes in different ages and constitutions, and in the different conditions of females in particular. In women with child, or who give suck, it is large, and generally longer or higher than it is thick or broad; and when it happens to be short it causes great uneasiness to the child. The texture of the nipple is spongy, elastic, and liable to divers changes of consistence, being sometimes harder, sometimes more flaccid. It seems to consist chiefly of ligamentary fasciculi; the extremities of which form the basis and apex

of the nipple. These fasciculi appear to be gently folded, or curled, during their whole length; and though, by drawing the fibres out, these folds seem to be obliterated, they return again as soon as that action ceases.

(343.) From 12 to 15, or 20 particular TUBES are lodged between these spongy and elastic fasciculi, at small distances from each other, and all in the same direction. These tubes go to the basis of the papilla, and run through the apex by the same number of almost imperceptible holes or orifices; and as they are closely united to the elastic fasciculi, they are folded in the same manner with them.

(344.) The papillæ are covered by a thin cutaneous production, and by the epidermis. Its outer surface is uneven, being full of small tubercles and wrinkles; among which, those near the circumference of the nipple seem to have a transverse or annular disposition, which, however, is not uniform. This direction seems to be owing to the elastic folds already mentioned: and, from this simple structure, it is easy to explain how infants, in sucking the nipple, and women in drawing the teats of cows, bring out the milk. For the excretory tubes, being wrinkled in the same manner as the fasciculi, do, by those wrinkles or folds, as by so many valves, hinder the milk contained in the ducts from flowing out; but, when the nipple is drawn and elongated, the tubes lose their folds, and the passage becomes straight. Besides this, when they are drawn with a considerable force, the whole body of the mamma is increased in length, and contracted in breadth, and thereby the milk is pressed into the open tubes; and thus, by barely pressing the body of the breast, the milk may be forced toward the nipple, and even through the tubes. Those, who understand the principles of the air-pump, will readily conceive the manner in which the child draws out the milk.

(345.) VI. The ARTERIES and VEINS, distributed through the mamma, are ramifications of the arteriæ and venæ mammaræ; of which one kind comes from the sub-claviæ, and are named *mammaria internæ*; the others, from the axillares, called *mammaria externæ*. These vessels communicate with each other, with those near them, and with the vasa epigastrica. The nerves come chiefly from the costales, and, by means of these, communicate with the nervi sympathetici. The mamma has numerous lymphatic vessels which Wrisberg observes run in two sets: Most of these vessels gradually collect into a great plexus, which go to the axillary glands; but others enter the thorax, through the interstices of the ribs, near the sternum, and communicate with the glands behind the mammary vessels.

(346.) The MILK, examined chemically, appears to be composed of oil, mucilage, and water, and of a considerable quantity of sugar. The generality of physiologists have supposed that, like the chyle, it frequently retains the properties of the aliment and medicines taken into the stomach; but from some late experiments, this supposition appears to be ill founded.

T O M Y.

59

lies, one for each lobe of the lungs. At the lower part of the thorax, these laminae afford a lodgement to the heart; and at the upper part of the cavity, they receive between them the thymus. The mediastinum does not, however, divide the thorax exactly in the middle, but towards the left side; and is so disposed, that the two cavities, into which it divides the thorax, do not end toward this membrane at an angle, but a segment of a circle.

(153.) Its use is to prevent one lobe of the lungs from pressing on the other, as in lying on one side the uppermost might do. But it is of still more importance, in preventing the disorders of one lobe of the lungs from affecting the other; for if the functions of both lobes were suspended by any disease at the same time, death must ensue. If, for instance, the point of a sword were to penetrate between the ribs into the cavity of the thorax, the lungs on that side would cease to perform their office; because the air being admitted through the wound, would prevent the dilatation of that lobe; but the other lobe, which is separated from it by the mediastinum, would remain unharmed, and continue to perform its function as usual.

SECT. IV. Of the TRACHEA, the LUNGS, and RESPIRATION.

(154.) The TRACHEA, or windpipe, is a cartilaginous and membranous canal, through which the air passes into the lungs. Its upper part, which is called the LARYNX, is composed of five cartilages. The uppermost of these cartilages is placed over the glottis or mouth of the larynx, and is called *epiglottis*, which performs the office of closing the passage to the lungs in the act of swallowing. At the sides of the glottis are placed the two arytenoid cartilages, which are of a very complex figure, not easy to be described.

(155.) The anterior and larger part of the larynx is made up of two cartilages, one of which is called *hyriformis* or *sterniformis*, from its being shaped like a buckler, and the other *cruciformis* or *ossicularis*, from its resembling a ring. Both these cartilages may be felt immediately under the skin, at the fore part of the throat; where the thyroidea, by its convexity, forms an eminence called *Pomum Adami*, which is usually more considerable in the male than in the female. All these cartilages are united to each other by means of very elastic, ligamentous fibres; and are enabled, by the assistance of their several muscles, to dilate or contract the passage of the larynx, and to perform that variety of motion, which seems to point out the larynx as the principal organ of the voice, for when the air passes out through a wound in the trachea, it produces no sound. These cartilages are moistened by a mucus, which seems to be secreted by minute glands situated near them. The upper part of the trachea is covered anteriorly and laterally by a considerable body, which is supposed to be of a glandular structure, and from its situation near the thyroid cartilage is called the *thyroid gland*; though its excretory duct has not yet been discovered, or its real use ascertained.

(156.) The GLOTTIS is anteriorly covered by

The MEDIASTINUM is formed by two lateral portions of the pleura, which pass lengthways into two cavities.

a very fine membrane, which is moistened by a constant supply of a watery fluid. From the larynx, the canal begins to take the name of *trachea* or *aspera arteria*, and extends from thence as far down as the third or fourth vertebra of the back, where it divides into two branches, which are the right and left bronchial tubes. Each of these bronchi ramifies through the substance of that lobe of the lungs, to which it is distributed, by an infinite number of branches, which are formed of cartilages separated from each other like those of the trachea, by an intervening membranous and ligamentary substance. Each of these cartilages is of an angular figure; and as they become gradually less and less in their diameter, the lower ones are in some measure received into those above them, when the lungs, after being inflated, gradually collapse by the air being pushed out from them in expiration. As the branches of the bronchi become more minute, their cartilages become more and more angular and membranous, till at length they are found to be perfectly membranous, and at last become invisible.

(357.) The trachea is furnished with fleshy or muscular fibres; some of which pass through its whole length longitudinally, while the others are carried round it in a circular direction; so that by the contraction or relaxation of these fibres, it is enabled to shorten or lengthen itself, and likewise to dilate or contract the diameter of its passage. The trachea and its branches, in all their ramifications, are furnished with a great number of small glands which are lodged in their cellular substance, and discharge a mucous fluid on the inner surface of these tubes.

(358.) As the cartilages of the trachea keep it constantly open, they afford a free passage to the air, which we are obliged to respire incessantly; and its membranous part, by being capable of contraction and dilatation, enables us to receive and expel the air in a greater or less quantity, and with more or less velocity, as may be required in singing or in declamation. This membranous structure of the trachea posteriorly seems likewise to assist in the descent of the food, by preventing that impediment to its passage down the oesophagus, which might be expected if the cartilages were complete rings. The trachea receives its arteries from the carotid and subclavian arteries, and its veins pass into the jugulars. Its nerves arise from the recurrent branch of the 8th pair, and from the cervical plexus.

(359.) II. The LUNGS are composed of two lobes, one seated on each side of the mediastinum. Each of these lobes is subdivided into two or three lobules, a kind of structure particularly distinguishable in such animals as have much motion in their backs, and for the same end that the liver is in the same animals. Their substance is composed of very small cells, which are the extremities of the *trachea arteria* or *bronchus*. The figure of these cells is irregular; yet they are fitted to each other so as to have common sides, and leave no void space. Within these cells there is secreted a quantity of mucus, and also a large quantity of the *materia perspirabilis*, which at once keeps the lungs from being dried by the air,

and produces the necessary discharge from the blood, which also takes place by perspiration through the skin. Throughout the whole texture of these cells are distributed the branches of the pulmonary artery and vein, which ramify to an infinite degree of minuteness, and supply the last mentioned secretions.

(360.) The pulmonary artery and vein, however, are not intended for the nourishment of the lungs; but the blood, in its passage through them, acquires certain essential properties from the action of the air, which it had lost in circulating through the rest of the body. The lungs are nourished from the *arteria bronchiales*, whose ramifications are seen creeping every where on the branches of the bronchi. The blood is brought back from them into the *vena azygos* by the bronchial vein.

(361.) III. RESPIRATION constitutes one of those functions which are properly termed *vital*, as being essential to life; for to live and to breathe are in fact synonymous terms. It consists in an alternate contraction and dilatation of the thorax, by first inspiring air into the lungs, and then expelling it from them in expiration. It will perhaps be easy to distinguish and point out the several phenomena of respiration; but to explain the physical cause will be attended with difficulty, for it will naturally be enquired, how the lungs when emptied of the air, and contracted by expiration, become again inflated, they themselves being perfectly passive? How the ribs are elevated in opposition to their own natural situation? and why the diaphragm is contracted downwards towards the abdomen? Were we to assert that the air, by forcing its way into the cavity of the lungs, dilated them, and consequently elevated the ribs and pressed down the diaphragm, we should speak erroneously.

(362.) What induces the first inspiration, it is not easy to ascertain; but after an animal has once respired, it would seem likely that the blood, after expiration, finding its passage through the lungs obstructed, becomes a stimulus, which induces the intercostal muscles and the diaphragm to contract, and enlarge the cavity of the thorax in consequence perhaps of a certain nervous influence, which we will not here attempt to explain. The air rushes into the lungs; every branch of the bronchial tubes, and all the cellular space into which they open, become fully dilated; and the pulmonary vessels being equally distended, the blood flows through them with ease. But the stimulus which first occasioned this dilatation ceases to operate, the muscles gradually contract, the diaphragm rises upwards again, and diminishes the cavity of the chest; they return to their former state; and as the air passes out in expiration the lungs gradually collapse, and a resistance to the passage of the blood again takes place. By the heart continuing to receive and expel the blood, the pulmonary artery begins again to be distended; the stimulus is renewed, and the same process is repeated, and continues to be repeated in a regular succession during life.

(363.) Although the muscles of respiration, having a mixed motion, are in some measure dependent on the will, yet no human being, after having

be of a firm ligamentous texture, from which all its fibres originate; and as they advance from thence towards the apex, the substance of the heart seems to become thinner.

(370.) III. The heart includes two VENTRICLES, or cavities which are separated from each other by a fleshy septum; one of these is called the *right*, and the other the *left ventricle*. The heart is externally covered by a very fine membrane; and its structure is perfectly muscular or fleshy, being composed of fibres passing in different directions; some longitudinally from the basis to the apex; others in an oblique or spiral course; and a third sort placed in a transverse direction.

(371.) Within the two ventricles we observe several furrows; and there are likewise tendinous strings, which arise from fleshy *columnæ* in the 2 cavities, and are attached to the valves of the auricles. That the use of these and the other valves of the heart may be understood, it must be observed, that four large vessels pass out from the basis of the heart, viz. two arteries and two veins; and that each of these vessels is furnished with a thin membranous production, which is attached all round to the borders of their several orifices, from whence hanging loosely down they appear to be divided into two or three distinct portions. But as their uses in the arteries and veins are different, so are they differently disposed. Those of the arteries are intended to give way to the passage of the blood into them from the ventricles, but to oppose its return; and, on the contrary, the valves of the veins are constructed so as to allow the blood only to pass into the heart.

(372.) In consequence of these different uses, we find the valves of the pulmonary artery and of the aorta attached to the orifices of those vessels, so as to have their concave surfaces turned towards the artery; and their convex surfaces, which mutually meet together, being placed towards the ventricle, only permit the blood to pass one way, viz. into the arteries. There are usually 3 of these valves belonging to the pulmonary artery, and as many to the aorta; and from their figure they are called *valvula semilunares*. The communication between the two great veins and the ventricles is by means of the two appendages or auricles into which the blood is discharged; so that the other valves which may be said to belong to the veins are placed in each ventricle, where the auricle opens into it.

(373.) The VALVES in the right ventricle are usually 3, and are named *valvula tricuspides*; but in the left ventricle we commonly observe only 2, and these are the *valvula mitrales*. The membranes which form these valves in each cavity are attached so as to project somewhat forward; and both the *tricuspides* and the *mitrales* are connected with the tendinous strings, which were described as arising from the fleshy *columnæ*.

(374.) By the contraction of either ventricle, the blood is driven into the artery which communicates with that ventricle; and these tendinous strings being gradually relaxed, as the sides of the cavity are brought nearer to each other, the valves naturally close the opening into the auricle, and the blood necessarily directs its course into

the then only open passage, which is into the artery; but after this contraction, the heart becomes relaxed, the tendinous strings are again stretched out, and, drawing the valves of the auricle downwards, the blood is poured by the veins into the ventricle, from whence, by another contraction, it is again thrown into the artery. The right ventricle is not quite so long, though somewhat larger than the left; but the latter has more substance than the other: and this seems to be because it is intended to transmit the blood to the most distant parts of the body, whereas the right ventricle distributes it only to the lungs.

(375.) IV. The AURICLES are two muscular bags, situated at the basis of the heart, at the sides of each other; and, corresponding with the two ventricles, are like those two cavities distinguished into *right* and *left*. These sacs, which are interiorly unequal, have externally a jagged appendix which, from its having been compared to the extremity of an ear, has given them their appellation of auricles.

(376.) From the par vagum and intercostals the heart is supplied with nerves. The arteries which are distributed to it, arise from the aorta, and are called *coronary arteries*. From these the blood is returned into the auricles by the *coronary veins*.

SECT. VI. Of the ACTION of the HEART, AURICLES, and ARTERIES.

(377.) The heart, at the time it contracts, drives the blood from its ventricles into the arteries, and the arteries being thus distended, are naturally inclined to contract the moment the heart begins to dilate, and ceases to supply them with blood. These alternate motions of contraction and dilatation of the heart and arteries, are distinguished by the names of *systole* and *diastole*. When the heart is in a state of systole, or contraction, the arteries are at that instant distended with blood, and in their diastole; and it is in this state we feel their pulsatory motion, which we call the PULSE. When the heart dilates, and the arteries contract, the blood is impelled onwards into the veins, through which it is returned back to the heart. While the heart, however, is in its systole, the blood cannot pass from the veins into the ventricle, but is detained in the auricles, which are two reservoirs formed for this use, till the diastole, or dilatation of the heart, takes place; and then the distended auricles contract, and drive the blood into the ventricles: so that the auricles have an alternate systole and diastole as well as the heart.

(378.) Though both the ventricles contract at the same time, yet the blood passes from one to the other. In the same moment, for instance, that the left ventricle drives the blood into the aorta, the right ventricle impels it into the pulmonary artery, which is distributed through all the substance of the lungs. The blood is afterwards brought back into the left ventricle by the pulmonary vein, at the same time that the blood returned by the cava, into the right ventricle from all the other parts of the body. This seems to be the mode of action of the heart and its vessels.

(379.) The cause of this action has, like all other intricate and interesting subjects, been di-

(in this case termed the *buff*); and the other, partly of this, and partly of the red globules.

(385.) By putrefaction alone, or the dissolving power of the air, in a heat equal to 96 degrees, the whole mass, but especially the serum, dissolves into a foetid liquor; the serum, first, and the cruor more slowly, till at length the whole mass, both of serum and cruor, is turned into a volatile and foetid exhalation, leaving very few fœces behind. The blood, being a little dissolved by the beginning putrefaction, becomes foetid; with the fœtor it assumes an alkaline nature, and effervesces with acids. This property it afterwards loses, the alkaline salt being destroyed by the complete putrefaction. The putrid blood cannot by any art be inspissated, and it is very difficult to resolve it, after it has been coagulated by spirit of wine. By too severe exercise, heat, and malignant disorders, the cohesion of the blood is dissolved, and it assumes an alkaline nature, almost as if from putrefaction.

(386.) The blood contains in its substance a quantity of *sea salt*, which is discernible to the taste, and sometimes visible by the microscope. That there is *earth* in the blood is demonstrated from nutrition, and from a chemical analysis; and this earth is chiefly found in the most fluid, and especially in the oily parts of the blood. By some late experiments, it appears, that a considerable quantity of ferruginous earth, easily reducible into metal by the addition of phlogiston, is contained in blood when calcined. Another part of the blood is *air* in an unelastic state, and that in a very considerable quantity, as is proved by putrefaction and distillation, or by removing the ambient air by the pump; but we are not to suppose that the blood globules are bubbles full of air, for they are specifically heavier than the serum. By the admixture of neutral salts the colour of the blood becomes deeper and brighter, without its being either dissolved or thickened. It is scarcely altered by a weak acid. By fermented liquors it is coagulated. Fixed alkaline salts have almost the same effect as neutral. The volatile alkalis rather turn it brown, and coagulate it. Alcohol, distilled oils, and vinegar, coagulate it. It does not effervesce with any salt.

(387.) After what has been observed of the structure and action of the heart and its auricles, there seem to be few arguments required to demonstrate the *CIRCULATION of the blood*, which has long ago been established as a medical truth. This circulation may be defined to be a perpetual motion of the blood, in consequence of the action of the heart and arteries, which impel it thro' all the parts of the body, from whence it is brought back by the veins to the heart. A very satisfactory proof of this circulation, and a proof easy to be understood, may be deduced from the different effects of pressure on an artery and a vein. If a ligature is passed round an artery, the vessel swells considerably between the ligature and the heart; whereas if we tie up a vein, it only becomes filled between the extremity and the ligature, and this is what we every day observe in bleeding. The ligature we pass round the arm on these occasions, compresses the superficial veins; and the return of the blood through them being impeded,

they become distended. When the ligature is too loose, the veins are not sufficiently compressed and the blood continues its progress towards the heart; and, on the contrary, when it is made tight, the arteries themselves become compressed and the flow of the blood through them being impeded, the veins cannot be distended.

(388.) Another effectual proof of the circulation, is the loss of blood that every living animal sustains, by opening only a single artery of a moderate size; for it continues to flow from the wounded vessel till the equilibrium is destroyed, which is essential to life. This truth was not known to the ancients; and it seems strange, that it did not lead them to a knowledge of the circulation, as it sufficiently proves, that all the other vessels must communicate with that which is opened. Galen, who lived more than 1500 years ago, drew this conclusion from it; and if we further observe, that he describes, (after Erasistratus who flourished about 450 years before him) several valves of the heart, and determines the disposition and uses, it will appear wonderful that a period of near 2000 years should afterwards elapse before the true course of the blood was ascertained. This discovery, for which we are indebted to the immortal Harvey, has thrown new lights on physiology, and the doctrine of diseases, and constitutes one of the most important periods of anatomical history.

PART VI. ANGEIOLOGY.

INTRODUCTORY REMARK.

(389.) ANGEIOLOGY has hitherto been restricted, by most anatomists, to the description of *BLOOD VESSELS*, though the literal meaning of the word admits of no such restriction. The word, *ANGEIOLOGIA*, is derived from *αγγιον*, a vessel, and *λογος*, a description or treatise; and therefore signifies a description of *vessels in general*. we can perceive no reason for this restricted application of the word, unless it be that Galen applied it to the doctrine of the blood vessels, a period, when a great number of other vessels since discovered in the human body, were quite unknown, we mean to use it in its original extensive sense; by comprehending not only blood vessels, but likewise the Lacteals, Lymphatics, and other branches of the absorbent system, under this division of our subject.

SECT. I. Of the ARTERIES and VEINS.

(390.) We have already observed, (part v. vi.) that the heart contracts itself, and throws blood from its two ventricles into the pulmonary artery and the aorta, and then relaxes itself, and receives a fresh supply from the pulmonary artery and the vena cava. We will now point out the principal distributions of the blood vessels.

(391.) From the right ventricle of the heart rises the *PULMONARY ARTERY*, which soon divides into two branches, one to each lobe of the lungs. They then subdivide into smaller and smaller branches, until they are distributed to every part of the lungs. From the extremities of the pulmonary artery arise the small branches of the pulmonary veins; which, as the

from the left auricle of the heart, unite in a trunk similar to the ramifications of the pulmonary artery in its egress from the heart; except that the veins enter the muscular appendix of the left auricle in several branches, and the blood being brought back from the lungs by these vessels to the left auricle and ventricle of the heart, is from the left ventricle of the heart thrown into the aorta.

(392.) The AORTA, or GREAT ARTERY, arises from the left ventricle of the heart, and deals out blood to every part of the body. The first part of this vessel is called *aorta ascendens*. It passes over the left pulmonary artery, and veins, and branch of the trachea, and being reflected under the left lobe of the lungs, it commences *aorta descendens*; which name it keeps through the thorax and abdomen, where it passes on the left side of the spine, till its division into the iliac arteries between the third and fourth vertebræ of the lumbar.

(393.) From beneath two of the semilunar valves of the aorta, and ere it leaves the heart, arise two branches, which are bestowed upon the heart itself, as we just now observed, and which are called *CORONARIÆ CORDIS*. From the curved part of the aorta, which is about two or three lines above the heart, arise the subclavian and carotid arteries; the right subclavian and carotid in one trunk, but the left single.

(394.) The CAROTID ARTERIES run on both sides the larynx to the sixth foramina of the skull, through which they enter and proceed to the brain; but as they pass through the neck, they give off branches to all the adjoining parts. These branches are called by the names of the parts they are bestowed upon; as, *laryngææ*, *thyroidææ*, *linguales*, *temporales*, *occipitales*, &c. but just before they enter the sixth foramina of the skull, they each send a small branch to the fifth foramina to that part of the dura mater, which contains the cerebrum. These arteries make those impressions that are constant on the ossa *bregmatis*: these branches, however, often arise from the temporal arteries.

(395.) The INTERNAL CAROTIDS send two trunks to the back part of the nose, and several branches through the first and second foramina of the skull to the face and parts contained within the orbits of the eyes, and then piercing the dura mater, they each divide into two branches, one of which they send under the falx of the dura mater, between the two hemispheres of the brain, and the other between the anterior and posterior lobes. These branches take a great magnitude, and divide into very small branches in the dura mater, before they enter the brain, because the pulse of larger arteries would make too violent an impression on so tender and delicate a part.

(396.) Besides the carotids, the brain has other arteries, called *CERVICALES*, which arise from the subclavian arteries, and ascend to the head through the foramina, in the transverse processes of the cervical vertebræ, and into the skull through the tenth or great foramen. These two arteries uniting soon after their entrance, send branches to the cerebellum, and then passing for-

wards, divide and communicate with the carotids; and the carotid arteries anastomosing with each other, there is an entire communication between them all; and these interposing branches are so large that every one of these four great vessels, with all their branches, may be easily filled with the common wax injections through any one of them.

(397.) The SUBCLAVIAN ARTERIES are each continued to the cubit in one trunk, which is called *axillaris* as it passes the arm-pits, and *humeralis* as it passes by the inside of the os humeri, between the muscles that bend and extend the elbow. From the subclavians within the breast arise the *arteriæ mammariæ*, which run on the inside of the sternum, and lower than the cartilago ensiformis. Soon after the arteria humeralis has passed the joint of the cubit, it divides into two branches, called *cubitalis superior*, and *cubitalis inferior*; which latter soon sends off a branch called *cubitalis media*, which is bestowed upon the muscles seated about the elbow.

(398.) The CUBITALIS SUPERIOR passes near the radius, and round the root of the thumb, and gives one branch to the back of the hand, and two to the thumb; one to the first finger, and a branch to communicate with the cubitalis inferior. The CUBITALIS INFERIOR passes near the ulna to the palm of the hand, where it takes a turn, and sends one branch to the outside of the little finger; another between that and the next finger, dividing to both; another in the same manner to the two middle fingers; and another to the two fore-fingers. These branches, which are bestowed on the fingers, run one on each side of each finger internally to the top, where they have small communications, and very often there is a branch of communication between the humeral and inferior cubital arteries. This communicant branch is sometimes very large, and liable to be pricked in opening the basilic vein, immediately under which, this branch almost always lies. See Plate VII. ARTERIES.

(399.) From the descending aorta on each side, is sent a branch under every rib, called *INTERCOSTALIS*, and about the fourth vertebra of the back, it sends off two branches to the lungs, called *bronchiales*, which are sometimes both given off from the aorta, sometimes one of them from the intercostal of the fourth rib on the right side. As the aorta passes under the diaphragm, it sends two branches into the diaphragm, called *arteriæ phrenicæ*, which sometimes rise in one trunk from the aorta, and sometimes from the cœliac. Immediately below the diaphragm arises the *cœliac artery* from the aorta. It soon divides into several branches, which are bestowed upon the liver, pancreas, spleen, stomach, omentum, and duodenum. These branches are named from the parts they are bestowed on, except two that are sent to the stomach, and which are called *coronaria superior* and *inferior*, and the branch running on the duodenum, which is named *intestinalis*.

(400.) At a very small distance below the arteria cœliaca from the aorta, arises the *MESENTERICA SUPERIOR*, whose branches are distributed upon the whole of the intestinum jejunum and ileum, part of the colon, and sometimes one branch

branch upon the liver. A little lower than the superior mesenteric artery arise the *emulgents*, which are the arteries of the kidneys; and a little lower than the emulgents, anterior to the aorta, arise the *arteria spermatica*, which are distributed to the genital parts in men. Laterally, and lower down, the aorta sends branches to the loins, called *lumbales*; and one forward, to the lower part of the colon and the rectum, called *mesenterica inferior*. Between the *arteria cœliaca*, *mesenterica superior* and *inferior*, and the branches of each near the intestines, there are large communicant branches to convey the blood from one to another, when they are either compressed by excrements, or from any other cause.

(401.) The aorta, as soon as it divides upon the loins, sends off an artery into the pelvis upon the os sacrum, called *arteria sacra*; and the branches into which the aorta divides, are called *iliacæ*. These again, at about the distance of two inches, divide into external and internal. The *iliacæ internæ* first send off the umbilical arteries, which are obliterated in adult bodies, except at their beginnings, which are kept open for the collateral branches on each side, one to the bladder, and one to the penis in men, and in women to the uterus. The rest of these branches are bestowed upon the glutæi muscles, and upper part of the thighs. The *iliacæ externæ* run over the ossa pubis into the thighs; and as they pass out of the abdomen, they send off branches, called *epigastricæ*, to the fore part of the integuments of the abdomen, under the recti muscles. The *epigastric* arteries send each a branch into the pelvis, and through the foramina of the ossa innominata, to the muscles thereabouts.

(402.) As soon as the iliac artery has passed out of the abdomen into the groin, it is called *inguinalis*, and in the thigh *cruralis*. Here it sends a large branch to the back part of the thigh; but the great trunk is continued internally between the flexors and extensors of the thigh, and passing through the insertion of the triceps muscle into the ham, it is there called *poplitea*. It then, below the joint, divides into two branches, one of which is called *tibialis antica*, which passes between the tibia and fibula down the fore part of the leg, and is bestowed upon the great toe, and one branch to the toe next to the great one, and another between these toes, to communicate with the *tibialis postica*; which artery, soon after it is divided from the antica, sends off the *tibialis media*, which is bestowed upon the muscles of the leg. The *tibialis postica* goes to the bottom of the foot and all the lesser toes. The *tibialis antica* is disposed like the cubitalis superior; the *postica* like the cubitalis inferior; and the *mediæ* in each have also like uses. These arteries are uniform in most bodies, but the lesser branches are distributed like the branches of trees, in so different a manner in one body from another, that it is highly probable no two bodies are exactly alike, nor even the two sides in any one subject.

(403.) The VEINS arise from the extremities of the arteries, and compose trunks which accompany the arteries in almost every part of the body, and bear the same names. The veins of the brain unload themselves into the sinuses, and the

sinuses into the internal jugulars and cervicals; and the internal jugulars and cervicals into the subclavians, which joining, make the cava descendens. The internal jugulars are seated near the carotid arteries, and receive the blood from all the parts which are supplied by the carotids, except the hairy scalp and part of the neck, whose veins enter into the external jugulars, which run immediately under the musculus quadratus genæ, often two on each side.

(404.) The CERVICAL VEINS descend, two through the foramina in the transverse processes of the cervical vertebræ, and two through the great foramen of the spine, and on each side the spinal marrow. These join at the lowest vertebra of the neck, and then empty into the subclavians, and at the interstices of all the vertebræ communicate with each other.

(405.) The VEINS of the EXTREMITIES are more than double the number of the arteries there being one placed on each side of each artery, even to the smallest branches that we can trace, besides the veins which lie immediately under the skin. Those which accompany the arteries, have the same names with the arteries. Those which run immediately under the skin of the back of the hand, have no proper names; they run from thence to the bend of the elbow, where the uppermost is called *cephalica*, the next *mediana*, and the last *basilica*. These all communicate near the joint of the elbow, and then send one branch which is more directly from the *cephalica* and bears that name until it enters the *subclavian* vein. It passes immediately under the skin, in most bodies, between the flexors and extensors of the cubit, on the upper side of the arm. The other branches joining, and receiving those which accompany the arteries of the cubit, they pass with them by the artery of the arm into the subclavian vein. The *cephalic* vein, as it runs up the arm, is very visible in most men, but in children is rarely to be seen.

(406.) In the thorax, besides the two cava there is a vein called *AZYGOS*, or *vena sine par*. It is made up of the intercostal, phrenic, and bronchial veins, and enters the descending cava near the auricle, as if its use was to divert the descending blood from falling too directly upon the blood in the ascending cava, and to direct the blood of the descending cava into the auricle.

(407.) In the abdomen, besides the cava ascendens, and other veins which are named like the arteries, there is one large vein, called *VENA PORTÆ*. Its branches arise from all those of the cœliac and two mesenteric arteries, except those branches bestowed on the liver, and uniting in one trunk, enter the liver. In this situation it is again distributed like an artery, and has its blood collected and brought into the cava by the branches of the cava in the liver; this vein being made use of, instead of an artery to carry blood to the liver, for the separation of bile. The blood moves here considerably slower than in the arteries, this slow circulation being probably necessary for the secretion of the bile.

(408.) In the leg the veins accompany the arteries in the same manner as in the arm, the external veins of the foot being on the upper side; and

est difficulty he could distinguish them from the fibres.

(417.) The COATS of the lymphatic vessels have, in common with all other parts of the body, arteries and veins, for their nourishment. This is rendered probable by their being susceptible of inflammation; for they are frequently found in the form of a cord, painful to the touch, and extending from an ulcer to the next lymphatic gland. These painful swellings of lymphatic vessels likewise show that their coats have sensibility, and therefore that they have nerves as well as arteries and veins. Besides, we can clearly trace, in different parts of the body, blood vessels running along their surfaces.

(418.) In most animals, but particularly in man and quadrupeds, the lymphatic vessels are full of VALVES. These valves have been described by the celebrated Nuck, Ruysch, and others, and are much more frequent than in the common veins, and thence these lymphatics have sometimes been distinguished by the name of *valvular lymphatic vessels*. These valves are generally two in number, of a semilunar shape, and the one sometimes much larger than the other. In most parts of the body these valves are so numerous, that there are 3 or 4 pair in an inch, but sometimes there is no more than one pair, and sometimes several inches appear without a valve. They are less numerous in the thoracic duct than in the branches of the system; thence it might be supposed, that in proportion as we go from the trunk to the branches, we should find them in greater number: but this is not always true, for Mr Hewson observed them more numerous, in the lymphatic vessels of the thigh, than on those of the leg. When the vessels are distended with lymph, they appear larger on that side of the valves next the heart; which sometimes gives a lymphatic vessel an appearance of being made of a chain of vesicles; as such they are represented by some authors; but it is an appearance that very seldom occurs in the human body. In quadrupeds, however, this appearance is very remarkable. Wherever a lymphatic vessel enters the thoracic duct or a red vein, we find either one or two valves, which prevent the return of the lymph, or hinder the blood from getting into the lymphatic.

(419.) V. The lymphatic system, in different parts of its course, has the GLANDS called *conglobate*, or LYMPHATIC. These glands are so placed, that the vessels come in on one side, and pass out on the other, in their way to the thoracic duct. They are commonly of an oval, though sometimes of a round form, and frequently somewhat flattened, and of various sizes, some being no larger than a millet seed, while others are almost an inch in diameter. They vary in colour in different parts of the body, and at different times of life. In young people they are generally of a reddish or brown colour; but become paler with age; they have a shining external surface, which is owing to a smooth dense coat that covers them. Like other glands, they have arteries, veins, and nerves which enter into their composition: but with respect to the rest of their structure, anatomists are much divided in opinion;

some endeavouring to prove that they are formed of cells, while others of equal credit consider them as a collection of vessels. Before the discovery of the lymphatic vessels in birds, fish and turtle, some anatomists considered these glands as so essentially necessary to the lymphatic system that they generally set about discovering the vessels by first looking for the glands: and wherever they found glands, they pronounced that there must be vessels; and when no glands could be seen, they thought it as certain a proof of there being no vessels. But that the glands are wanting in some animals, is now generally known.

SECT. III. Of the LYMPHATICS of PARTICULAR PARTS.

(420.) From the preceding general description of the Absorbent System, it appears, that, besides the glands, it is divided into 3 parts, viz. the *lacteals*, the *lymphatic vessels*, and the *thoracic duct*. The lacteals belong to the intestinal tube; the lymphatics, to all the other parts of the body; and the thoracic duct is the common trunk which receives both the lacteals and lymphatics. Of these a copious description has been given by Dr William Hunter, Mr Hewson, and other anatomists, by whose industry this part of anatomy has been greatly illustrated. Since, notwithstanding their importance in the animal economy, very minute account of the course and number of lymphatic vessels in each particular part of the body cannot be of any great degree of practical advantage to the student, we shall not pursue the subject to any unnecessary length.

(421.) The lymphatics may be divided into two kinds, viz. *superficial* and *deep seated*.—The SUPERFICIAL LYMPHATICS consists of numerous vessels that lie between the skin and the muscles and belong to the surface of the body or the skin and to the cellular membrane which lies immediately under it. Numerous large branches of these can be readily enough discovered in the limbs of dropical subjects. Many of them run upon the top of the foot; others are generally to be found just under the inner ankle. By means of tubes which have been introduced into two of them, the lymphatics have been filled the whole length of the lower extremity. See Pl. VIII. ABSORBENT.

(422.) The greater number of superficial lymphatics accompany the *vena saphena major*. These can be first traced from the toes, where they run somewhat like the arteries and veins. A plexus consisting of several vessels, runs over the top of the foot with the saphena to the inner ankle, and from thence upwards to the inner side of the knee. Here they are joined by another plexus which arises from the sole, and passes up on the inner and back part of the leg. A third plexus arises from the outer side of the foot, and runs to the outer ankle. Upon the outer part of the leg these split into two divisions; one of which crosses obliquely over the fore part of the leg, to the lymphatics at the inner side of the knee, while the remaining part accompanies the *vena saphena major*, and runs to the *glandulae popliteae*. From the inside of the knee a plexus runs up, consisting of from a dozen to twenty trunks, which pass afterwards on the anterior and inner side of the thigh.

mon course, situation, and structure of the receptaculum chyli and thoracic duct; but there often exists a variety in these parts, in different subjects. The sac is sometimes situated lower down than in the former description; is not always of the same dimensions; is not composed of the same number of ducts; and frequently appears to consist of several small cells or ducts, instead of being one simple cavity. Besides these deviations from the original structure many other differences have been observed in dissections.

SECT. V. *Of the ABSORBENT VESSELS of the TRUNK.*

(433.) The LYMPHATICS of the lower extremities having reached the trunk of the body, and passed under Poupart's ligament, appear upon the sides of the ossa pubis near the pelvis. A part of them passes up along with the iliac artery upon the brim of the pelvis; and another dips down into the cavity of the pelvis, and joins the internal iliac artery near the sciatic notch. At this place they are joined by the lymphatics from the contents of the pelvis, particularly from the bladder, and vesiculæ seminales in the male, and from the uterus in the female; and there are likewise several branches which pass through the sciatic notch from the neighbourhood of the glutæi muscles.

(434.) The lymphatic vessels of the UTERUS, like its blood vessels, are much enlarged, and therefore easily distinguished, in the pregnant state of that organ. They are in two sets; one runs along with the hypogastric arteries and veins; the other with the spermatic vessels. The lymphatics of the external parts of generation in the female go partly to the inguinal glands of each side, and partly through the rings of the external oblique muscles to terminate in the glands of the loins or pelvis. At this part, where so many lymphatic vessels join, there are commonly one or two glands.

(435.) Besides those lymphatic vessels, which dip down into the cavity of the pelvis, on the inside of the external iliac artery, there are others which keep on the outside of that artery, upon the psoas muscle. Of these, one part passes up to the loins, and goes under the aorta in different branches, getting from the left side to the right, and joining the thoracic duct; and another passes under the iliac arteries, and appears upon the os sacrum, making a beautiful net-work, joining the lymphatics of the right side, and passing under the ilia artery, to form a net work upon the right psoas muscle. In different parts of this course, from Poupart's ligament to the loins, and also in the loins themselves, there are, in most subjects, many lymphatic glands.

(436.) The lymphatic vessels of the right side, joined by some from the left, having now reached the right lumbar region, appear there in the form of a plexus of large vessels, and pass through several glands. At this part, likewise, they receive large branches, under the aorta, from the plexus on the left side of the loins; and having at last got up, as high as the second, or third, lumbar vertebra, they all join, and form a single trunk, called the THORACIC DUCT. See Plate VIII. fig. 4.

At this part they are likewise joined by the lacteals, which shall be next described.

(437.) The LACTEAL VESSELS, so called from their commonly conveying a fluid of the colour of milk, are found in two sets, which communicate with each other; the internal begin from the inner surface of the intestines, where each lacteal is at first formed, upon the surface of the villi, by numerous small radiated branches, with orifices destined to imbibe the nutritious fluid or chyle. From the cavity of the intestines, these vessels pass obliquely through their coats, uniting as they go, so as to form larger branches. They follow the course of the arteries and the veins, and at double their number; one being situated on each side.

(438.) These branches run on the outside of the gut to that part which is next the mesentery, and, whilst they are yet upon the gut, they are sometimes of a size sufficient to admit a small pipe, so that they have been frequently injected with mercury, in the human subject. And in man, as well as in different animals, the external set appear between the peritoneal and muscular coat, and commonly run for a considerable way in the same direction with the intestine. From the intestines, they run along the mesentery as mesocolon, towards the spine; passing through the lacteals, in their way to the conglobate mesenteric glands. These glands divide the lacteals into two regions: from the intestines to the glands, these vessels are called *lactea primi generis*; and from the glands to the thoracic duct *lactea secundi generis*.

(439.) The lacteals of the JEJUNUM are large and more numerous than those of the ILLUM. Those of the small intestines, as they run upon the mesentery, commonly accompany the superior mesenteric artery, and unite, as they proceed, into larger branches; so that, by the time they arrive at the root of the mesentery, they are of a considerable size. From the mesenteric artery they descend by the sides of the aorta, and open at last, into the thoracic duct: the lymphatics of the large intestines run somewhat differently. Those from the cæcum, and from the right part of the great arch of the colon, join the trunks of the lacteals of the small intestines about the root of the mesentery, whilst those from the rest of the colon, terminate in the lumbar glands, lower part of the thoracic duct, accompany the inferior mesenteric artery, and communicate with the large lymphatic vessels near its root.

(440.) The lymph of the other abdominal viscera likewise enters into the thoracic duct. This is brought by a number of vessels, which, in the viscera, run in a superficial, and in a deep plexus. A plexus of them may be traced from each KIDNEY, lying principally behind the emulgent artery, and opening into large lymphatic vessels near the aorta. The lymphatics of the kidney are seldom seen in the sound state of that viscus; but when it is enlarged or ulcerated, they are sometimes distinctly observed: they run from its outer towards its inner edge, and immediately afterwards they pass through the glands of the loins. The lymphatics of the glandulæ renales, or renal capsulæ, likewise terminate in the renal plexus.

(441.) T

thors, as the beginning of the duct. From this part it passes upwards, being at first covered by the crus diaphragmatis, and afterwards appears in the thorax, upon the spine between the aorta and the vena azygos. In the thorax, it receives some lymphatics from the intercostal spaces, and afterwards vessels from the lungs.

(450.) The superficial lymphatics of the LUNGS form a beautiful net-work, the larger branches running chiefly between the lobules, the smaller passing over them; and here, as well as on the liver, and other parts there are numerous valves, the existence of which has been denied by some authors. From the surface they pass to the root of the lungs, and there they go through the bronchial glands. At this place they are joined by the deep-seated absorbents, which creep along the branches of the trachea, and likewise on those of the pulmonary artery and vein.

(451.) Having left the glands, the principal part of those from the left lung form a trunk which terminates in the thoracic duct, behind the division of the trachea into its right and left branches. The rest of the absorbents of the left lobe pass through glands behind the arch of the aorta, and which are likewise common to those of the heart. They run at last into the thoracic duct near its termination in the red veins. After leaving the bronchial glands, the absorbents of the right lung form three or four principal trunks; one of which commonly ascends on the fore part of the vena cava superior, and opens into the lymphatic trunk, that terminates in the veins of the right side of the neck. The rest of these trunks go into the thoracic duct at the root of the lungs; and near this place the absorbents of the right and left lungs communicate pretty freely together.

(452.) There are many glands called BRONCHIAL, at the root of the lungs, where the large blood-vessels enter. They generally are of a blackish colour in the human subject, and have been suspected to secrete the mucus which is spit up from the trachea; but later anatomists having frequently distinctly filled them with mercury, by injecting the lymphatic vessels of the lungs, think it evident that they are not mucous but lymphatic glands.

(453.) The ABSORBENTS of the HEART, which have been known only by the latest anatomists, come from its superficial and deep parts. These afterwards form principal trunks which accompany the coronary arteries and veins, and like them the largest belong to the left ventricle. From the side of the right coronary artery, an absorbent passes over the arch of the aorta, to a gland commonly found behind the origin of the carotid arteries. The lymphatic, accompanying the left coronary artery, is formed of two principal branches; one of which runs up in the groove between the ventricles, and on the superior surface of the heart; the other runs in a corresponding groove on the under side of the heart; and having reached the space between the auricles and ventricles, turns round to join the former branch near the origin of its corresponding artery. Frequently, there are a considerable number on its sides, and upon the lumbar vertebræ.

(454.) There are also lymphatic glands over the trunks of blood-vessels of the spleen, liver, kidneys, and renal capsulæ, which belong to the lymphatic vessels of these organs. In the thorax a few glands are found on the fore part of the pericardium, and upper surface of the diaphragm, belonging to the liver or diaphragm. Others are situated between the laminae of the anterior portion of the mediastinum. Lymphatic glands are sometimes observed by the sides of the thoracic duct, particularly about the middle of the thorax, which belong principally to the vessels of the lungs.

(455.) There are likewise many BRONCHIAL lymphatic glands, near the root of the lungs; these glands are placed upon the lymphatic vessels, where they quit the lungs. But no lymphatic glands have yet been observed in the substance of the lungs; and the tubercles, which are suspected to be obstructed lymphatic glands, seem to have a different origin. There are likewise some glands seen on the lymphatic vessels, which lie near the subclavian veins at the upper part of the thorax, and which belong to the lungs.

(456.) Besides these, there are some lymphatic glands, upon the aorta near the œsophagus; and there are also others occasionally met with in the intercostal spaces. There are generally two or three contiguous to the thoracic duct, at the lower part of the neck and upper part of the thorax, near the termination of that duct, in the angle between the left jugular and the left subclavian vein; and a few are found over the internal mammary vessels where the absorbents of the liver pass up within the thorax.

PART VII. NEUROLOGY.

SECT. I. Of the BRAIN in GENERAL and its INTEGUMENTS.

(457.) We cannot, with any propriety, enter upon NEUROLOGY, or the description of the NERVE, without first describing THEIR FOUNTAIN,—the principal seat of the rational soul, commonly called the BRAIN. This name is given to all the mass which fills the cavity of the cranium, and which is immediately surrounded by two membranes, called *Mnnyfns*, *meninges*, by the Greeks, but *matres* by the Arabians, who were of opinion that these membranes were the origin, and, as were, the *mothers* of all the other membranes of the body. The name given them, by the Arabians is still retained.

(458.) This general mass is divided into the particular portions; the *cerebrum*, or brain properly so called, the *cerebellum*, and *medulla oblongata*. To these three parts contained within the cranium, a fourth is added, which fills the great canal of the spina dorsa, and is known by the name of *medulla spinalis*, being a continuation of the medulla oblongata.

(459.) The INTEGUMENTS of the brain are the two membranes above-mentioned: called *dura mater* and *pia mater*. The first is very strong, and lies contiguous to the cranium; the other is very thin, and immediately touches the brain. T

striata; the other two, *thalami nervorum optico-rum*. Beyond these are other two processes, called *nates*; and under them, nearer the cerebellum, two called *testes*.

(468.) Above the nates is situated the GLANDULA PINEALIS, famous for being supposed, by Des Cartes, the seat of the soul. Upon the thalami nervorum optico-rum are a number of blood vessels, glands, and lymphatics, called *plexus chorooides*. Under the beginning of the fornix is a small hole, called *foramen ad radices fornicis*, or *iter ad infundibulum*; and under the middle of the fornix, one called *foramen posterius*, which is covered with a valve, named *membrana*, or *valvula major*; and the space under the two anterior ventricles, between the foramina and the cerebellum, is the third ventricle.

(469.) II. The CEREBELLUM is situated under the second process of the dura mater. By dividing this part of the brain lengthways we discover more plainly the fourth ventricle, whose extremity is called *calamus scriptorius*. Here also appear two medullary bodies, called *pedunculi*, which are the basis of the cerebellum. The medullary part in the cerebellum, though it is inmost, as in the cerebrum, yet is of a different shape, being branched out like a plant.

(470.) The SUBSTANCE of the BRAIN is distinguished into outer and inner; the former called *corticalis*, *cinerea*, or *glandulosa*; the latter *medullaris*, *alba*, or *nervosa*.

(471.) III. The MEDULLA OBLONGATA is a medullary continuation of the under part of the cerebrum and cerebellum. It first appears in two bodies from the anterior part of the posterior lobes of the cerebrum, called *crura medullae oblongatae*. The union of these crura between the cerebrum and cerebellum is called *isthmus*; and immediately beyond this is an eminence named *processus annularis*.

(472.) IV. The MEDULLA SPINALIS, or SPINAL MARROW, is a production of the medulla oblongata through the great foramen of the skull, and through the channel of the spine. It enlarges about the last vertebrae of the back and first of the neck, where the large nerves are given off to the arms. It again enlarges in the loins, where the crural nerves begin; and the lower end of it, joined with those and other nerves, is called, from its resemblance to the tail of a horse, CAUDA EQUINA. The coats of this part are the same with those of the brain; but the membrane here, which is analogous to the dura mater, is thinner and more connected to the bones, and the tunica arachnoides more conspicuous.

SECT. III. Of the NERVES.

(473.) From the medulla oblongata and medulla spinalis a vast number of small medullary white fibres are sent out, which, at their first egress, seem easily to separate; but as they pass forward are somewhat more, but still loosely connected, by the coat which they obtain from the pia mater, and at last piercing the dura mater, are closely embraced by that membrane, which covers them in their progress. Hence they become white, firm, strong cords, and are well known to anatomists by the name of NERVES.

To these coats an infinite number of small vessels, both arteries and veins, are distributed.

(474.) Although the NERVES, if all joined together, would hardly make a cord of an inch diameter, yet, from their existing in almost every part, they would appear to be distributed with the utmost degree of minuteness. In their course to the places for which they are destined they generally run as straight as the part over which they are to pass, and their own security from external injuries, will allow, sending off their branches at very acute angles, and consequently running more parallel than the blood vessels. Their distribution is seldom different in the opposite sides of the same subject, nor indeed in any two subjects is there any considerable variety to be found. Frequently nerves which come out distinct or separate, afterwards conjoin into one fasciculus, under the same common covering; and though the nervous fibrils probably do not communicate, yet because the coats at the conjoined part are common, and these strong coats may have great effects on the soft pulpy nerves, it is evident that such will have a considerable sympathy with one another.

(475.) In some parts where these conjunctions take place, the size of the nerves seems much increased, and those knotty oval bodies, named GANGLIONS, are formed. The coats of the knots are stronger, thicker, and more muscular than the whole nerves which enter into them; they would seem to constitute; while the nervous fibrils pass through without any great change.

(476.) The nerves are distinguished into two classes, viz. those of the ENCEPHALON, or medulla oblongata, and those proceeding from the medulla spinalis. Of the first there are generally ten pair reckoned, of the last thirty. We shall describe the nerves in the order in which they are generally ranked, though it is not possible to prosecute the dissection of them after the same manner; but to supply this deficiency, we shall afterwards mention the order wherein they may all be demonstrated on one subject.

(477.) I. Of the ten pair proceeding from the encephalon, the first are the OLFACTORY NERVES, which long had the name of *processus mammillares*, and are small, long, and without any cavity. Rising from that part of the brain where the carotid arteries are about to enter, and running under the anterior lobes of the brain, they become a little larger, till they reach the os crebriforme, into the foramina of which the small filaments sinuate themselves, and are immediately spread on the membrana narium.

(478.) II. The 2d. pair are the OPTIC NERVES, which arise single from the thalami nervorum optico-rum, and then uniting at the fore part of the sella turcica, seem to be pretty much blended. They afterwards divide, and running obliquely forwards, pass out at their proper orifice in the sphenoid bone, and enter the globe of the eye to be expanded into the membrana retinae. The blood vessels running through the middle of the nerves, and the ramifications of the retina are very observable, whence we may account for such objects, as fall on the entry of the optic nerve, being lost to us.

Haller, that the nervous fluid is by the mind, or otherwise, impelled into the muscle.

(517.) "That in this instance, we cannot comprehend by what power the nervous fluid or energy can be put in motion, must perhaps be granted; but has Dr Haller given a better explanation of the manner, in which his supposed *vis insita* becomes active?—If it be as difficult to point out the cause of the action of the *vis insita*, as that of the action of the *vis nervea*, the admission of that new power, instead of relieving, would add to our perplexity. We should then have admitted, that two causes of a different nature were capable of producing exactly the same effect; which is not in general agreeable to the laws of nature.

(518.) "We should find other consequences arise from such an hypothesis, which tend to weaken the credibility of it. For instance, if in a sound animal the *vis nervea* alone produces the contraction of the muscles, we will ask what purpose the *vis insita* serves? If both operate, are we to suppose that the *vis nervea*, impelled by the mind or living principle, gives the order, which the *vis insita* executes, and that the nerves are the *internuntii*; and so admit two wise agents employed in every the most simple action? But instead of speculating farther, let us learn the effect of experiments, and endeavour from these to draw plain conclusions.

(519.) "I. When I poured a solution of opium in water under the skin of the leg of a frog, the muscles, to the surface of which it was applied, were very soon deprived of the power of contraction. In like manner when I poured this solution into the cavity of the heart, by opening the *vena cava*, the heart was almost instantly deprived of its power of motion, whether the experiment was performed on it fixed in its place, or cut out of the body.

(520.) "II. I opened the thorax of a living frog; and then tied or cut its aorta, so as to put a stop to the circulation of its blood. I then opened the *vena cava*, and poured the solution of opium into the heart; and found, not only that this organ was instantly deprived of its powers of action, but that in a few minutes the most distant muscles of the limbs were extremely weakened. Yet this weakness was not owing to the want of circulation, for the frog could jump about for more than an hour after the heart was cut out. In the first of these two experiments, we observe the supposed *vis insita* destroyed by the opium; in the latter, the *vis nervea*; for it is evident that the limbs were affected by the sympathy of the brain, and of the nervous system in general, with the nerves of the heart.

(521.) "III. When the nerve of any muscle is first divided by a transverse section, and then burnt with a hot iron, or punctured with a needle, the muscle in which it terminates contracts violently, exactly in the same manner as when the irritation is applied to the fibres of the muscle. But when the hot iron or needle is confined to the nerve, Dr Haller himself must have admitted, that the *vis nervea*, and not the *vis insita*, was excited. But here I would ask two questions.

(522.) "First, Whether we do not as well understand, how the *vis nervea* is excited when irrita-

tion is applied to the muscle, as when it is applied to the trunk of the nerve, the impelling power of the mind seeming to be equally wanting in both cases?

(523.) "Secondly, If it appears that irritation applied to the trunk of a nerve excites the *vis nervea*, why should we doubt that it can equally well excite it, when applied to the small and very sensible branches and terminations of the nerve in the muscle?

(524.) "As, therefore, it appears that the supposed *vis insita* is destroyed or excited by the same means as the *vis nervea*; nay, that when, by the application of opium to the heart of a frog, after the aorta is cut and the circulation interrupted, we have destroyed the *vis insita*, the *vis nervea* is so much extinguished, that the animal cannot act with the distant muscles of the limb; and that these afterwards grow very torpid, or lose much of their supposed *vis insita*; it seems clearly to follow, that there is no just ground for supposing that any other principle produces the contraction of a muscle."

(525.) The *VIS NERVOSA*, or operation of the mind, if we may so call it, by which a muscle is brought into contraction, is not inherent in the muscle like the *vis insita*, neither is it perpetual like this latter property. After long continued or violent exercise, for example, the voluntary muscles become painful, and at length incapable of further action; whereas the heart and other involuntary muscles, the motions of which depend solely on the *vis insita*, continue throughout life in a constant state of action, without any inconvenience or waste of this inherent principle.

(526.) In a word, the action of the *vis nervea* on the voluntary muscles constitutes what is called muscular motion; a subject that has given rise to a variety of hypotheses, many of them ingenious, but none of them satisfactory.

(527.) EXPLANATION of PLATE VIII.

FIG. 1. A VIEW of the HEART and BLOOD VESSELS.

1. The right ventricle of the heart of a foet injected with wax. 2. The right auricle. 3. The left auricle. 4. Branches of the pulmonary vein of the right lobe of the lungs, those of the left being cut off short. 5. The arteries of the left lobe of the lungs. 6. The *vena cava* descending. 7. Aorta ascendens. 8. Arteria pulmonalis. 9. Ductus arteriosus.

FIG. 2. ANOTHER VIEW of the BLOOD VESSELS.

10. The umbilical vein. 11. Branches of the *vena portarum* in the liver. 12. Ductus venosus. 13. Branches of the *cava* in the liver. 14. *Vena cava*.

FIG. 3. The INSIDE of the ARM dissected, to show the COURSE of the VEINS, ARTERY, &c.

1. Part of the biceps flexor cubiti. 2. The *clavicula tendinosa* from that muscle, which is liable to be pricked in opening the basilic vein. 3. The humeral artery, on each side of which is a large vein. 4. *Vena cephalica*. 5. *Vena mediana*. 6. *Vena basilica*.

secure degree of feeling: And other parts, such as the bones, cartilages, epidermis, &c. we will admit, have none. From the experiments made by Baron Haller, it even appears, that the ligaments, tendons, dura and pia mater, pericardium and periosteum, which were formerly supposed to be highly sensible, are void of sensibility in a state of health. But all this is owing to their having no nerves. And even these in certain stages of disease, when by swellings, or otherwise, they affect the adjacent nerves, become highly sensible. In short, the ramifications of the nerves are so universally diffused through the whole body, that the sense of feeling, with a very few exceptions, extends more or less to every part of it, and might, therefore, be stiled, in comparison of the other four, the UNIVERSAL SENSE. Indeed, if it were otherwise, amputations and other painful operations in surgery might be performed with very little trouble to the patient.

(532.) Upon this general view of the sense of feeling, as diffused through the whole system, for obvious and useful purposes, it appears, like the other senses, indeed, to be in general *passive*; as we cannot help feeling the impression of an object that *touches* any part of our body, whether hard, soft, solid, fluid, sharp, blunt, hot or cold, &c. But although it is in general a passive sense, it is capable by an effort of the will, of making those *active* exertions, which properly come under the denomination of TOUCH. This active power seems chiefly lodged in the hands, or rather in the fingers, which may be thus accounted for.

(533.) The papillæ of the fingers, or inside of the hand, may, by the operations of the mind, become erect or elevated, and being then gently pressed or rubbed against a tangible body, they receive an impression, which is conveyed to the brain, and is what we call the TOUCH. By this exertion we perceive the different qualities of bodies. Humidity, softness, hardness, figure, &c. are the result of examination by the touch, which likewise serves to correct the mistakes of our other senses, though it sometimes errs itself. The rete mucosum moderates the action of the object touched, and preserves the softness of the papillæ. The cuticle excludes the air from withering and destroying the skin; and qualifies the impressions of bodies, so that they may be only sufficient to affect the touch, without causing pain.

(534.) The exterior properties of bodies, such as their solidity, moisture, inequality, smoothness, dryness, or fluidity, and likewise their degree of heat or cold, are all capable of making different impressions on the papillæ, and consequently of exciting different ideas in the sensorium. But this organ, like all the other senses, is not equally delicate in every subject; being in some much more exquisite than in others. In persons born blind, it is sometimes so exquisite, as in a considerable degree to supply the place of sight. We have read of a French lady of the present age, born blind, who had acquired a degree of touch so incredibly delicate, as to be able to read a printed book merely by feeling the forms of the letters, from the impression made by the types! Though we will not vouch for this fact, yet it is certain, that blind

persons often make wonderful acquisitions, merely by the habitual use of the sense of feeling, and repeated exertions of the touch.

SECT. III. Of TASTING.

(535.) The sense of TASTING, falls naturally to be considered after that of FEELING, as it is not only in some respects a *species* of it, but its principal organ, like those of the other, is furnished with papillæ. The tongue, every body knows is the chief organ of the TASTE; and, from certain experiments, it appears that this sense is exercised by the tongue chiefly, although it is not confined to that member alone. For, on whatever part of the mouth, palate, or gums, we apply a sapid body, we do not perceive the sense of pain but of taste; and from some bodies, as arum pepper, &c. the sensation produced will be stronger and more distinct in these parts, than any where else. That sensation which is sometimes excited in the stomach, œsophagus, and fauces, by the regurgitation of the aliments, seems also to belong to the tongue, to which the sapid vapours are sent back, uncommonly acrid and penetrating; and even that which is sometimes occasioned in the stomach, œsophagus, and fauces, from a rising of the aliments, seems also to be owing to the tongue, to which the tasteable vapours are conveyed.

(536.) The PAPILLÆ of the tongue, which are larger and softer than those of the skin, and perpetually moist, perform the office of touch more exquisitely than the small and dry cutaneous papillæ. The papillæ of the tongue being raised a little protuberant to perform the office of taste, are affected in a particular manner by salts dissolved in water or saliva, and applied against their tips or summits, which being distinguished by the mind, and referred to certain classes, are called *tastes*; either sour, sweet, acerb, bitter, saline, urinous, spirituous, aromatic, or pungent and acrid, insipid, putrid, and others resulting partly from pure salts and in part from an intermixture of the subtil animal, or vegetable oils, variously compounding and changing each other.

(537.) It has been a question whether the diversity of the tastes arises from the different figures which are natural to salts? And whether the cubical figure of sea salt is the reason of its having a different taste from the nitre that is prismatical or from other salts of a different form? We answer that this does not seem probable; for, even tasteless crystals have their particular configurations and the taste arising from very different salts, are to much like each other, and at the same time too inconstant and changeable, to allow such a theory for example in nitre. The mechanical reason therefore, of the diversity of tastes, seems to reside in the intrinsic fabric of the elements of sapid bodies, which do not fall under the scrutiny of our senses.

(538.) The nature or disposition of the covering with which the papillæ are clothed, together with that of the juices, and of the aliments lodged in the stomach, have a considerable share in determining the sense of taste; insomuch, that the same flavour does not equally please or affect u

...the whole of the touch.

SECT. III. OF TASTE.

[illegible]

age in all ages alike, nor in persons of all temperaments; nor even in the same person at different times, and in different states of health or disease. In general, whatever contains less fat than the fibres itself, seems insipid.

[illegible]

persons of all times, knowing them by a

terrible disease, or to reject malignant plants from among those that are fit for food.

(143.) The act of smelling is performed by means of a first policy membrane, full of pores and small vessels, which lines the whole internal cavity of the nostrils, and is there upon the separation and the reciprocal conditions, but thinner in the nares. Within this membrane are distributed vessels and nerves which have been already described.

(144.) The NERVE of the nose, being almost naked, requires a defence from the air, which constantly draws through the nostrils, and blowing of the nose, and perfumes it. This part, and the organ of feeling, is therefore supplied with a thick mucus species, very fluid in its first separation, but by the air condensing into a thick, dry, and more confluent crust. By this mucus the nerves are defended from drying and from pain. It is poured out from many small arteries, and is not so sticky as the mucus of the eye. It is secreted, and partly into yellowish crystals of cells, scattered over all the nostrils. It rises out all over the surface of the olfactory membrane, which is seated with it on all sides. This mucus is accumulated during night, but, in the day it either flows spontaneously, or may be more powerfully expelled by blowing the nose. By continuing and heating it, it irritates the vessels of the sensory of the membrane, when a sneezing is excited for its removal.

(145.) The STRUCTURE of this part, which abound with mucus, are evacuated through apertures described, Part I. Sect. III. § 230. The tears defended, by a channel proper to themselves, into the cavity of the nose, and perfumes it.

(146.) The cartilage under the nose moveable by its proper muscles, so as to be raised and dilated by a muscle common to the upper lip, and to be contracted together into a narrow compass by the proper depressor and compressor muscles pulling down the septum. Thus the prominent organ of smelling is adapted to the reception of the smell, and is adapted to proportion to the quantity of inhaled air, and again contracted, when the air is expelled in the same degree. The tip of the nose, filled with the flexible and invisible cellular bodies, consisting of their volatile, oily, and falling particles, as by the powers of respiration, urged through the nose, and applied to the almost naked, and continually vibrating surface, in which a kind of feeling is excited, which we call smelling, and by this sense we distinguish several kinds of smells and tastes, by different scents or odours, which are not easily reducible to classes, or recalled by memory. The odours, however, already established, are sufficient for our purpose.

(147.) This sense serves to admonish us not only of persons, but of a great variety of violent smells, of a mixed and fowly quality in bodies. As fish, joined with an oil, is the object of taste and a volatile oil, added to fats, serves to excite smell, we say perceive the affinity of these two

Nose

senses; which affinity seems to be the more necessary, on account of these senses mutually and jointly assisting each other in performing their offices. Volatile particles are chiefly distinguished by smell, and fixed ones by taste; perhaps because the thick mucous cuticle, spread over the tongue, intercepts the actions of the more subtle saline effluvia from acting upon the taste, which yet easily affect the softer and less covered nerves of the internal nose.

(547.) We know, not the reason why some smells please, and others displease; perhaps custom may have some influence in this respect. The power of odours is strong and quick, because minute particles of matter are immediately applied to naked nerves situated very near the brain. Hence the force of poisonous vapours, and hence also the quality certain odours possess, of recovering people from faintings, or after drowning. Hence also that violent sneezing which often arises from acrid particles, and a diarrhoea from the smell of some medicines; hence the power of particular antipathies. Hence also the pernicious effects of excessive sneezing, more especially in producing blindness, which may, in some measure, also be more easily brought on by the consent of the nerves, which are exceedingly numerous in the neighbouring organs. Among the various parts of the nose, the septum, and more especially the os turbinatum, have a considerable share in the organ of smelling, these parts being multiplied in quick-scented animals. In dogs and other quadrupeds, they are prodigiously lengthened, and beautifully formed into spiral laminae: in fishes they are elegantly formed, like the teeth of a comb.

SECT. V. OF HEARING.

(548.) Previous to a description of the manner, in which we are enabled to receive the impressions of sound, it is proper to describe the EAR, which is the ORGAN OF HEARING. It is commonly distinguished into *external* and *internal*. The former includes all that we are able to discover without dissection, and the meatus auditorius, as far as the tympanum; and the latter, all the other parts of the ear.

(549.) The EXTERNAL EAR is composed of cartilage, (a substance best suited to preserve its form, without being liable to break,) covered by the common integuments, and attached, by ligaments and muscles, to the temporal bone. Although capable only of a very obscure motion, it is found to have several muscles. Different parts of it are distinguished by different names; all its cartilaginous part is called *ala*, or *wing*, to distinguish it from the soft and pendent part below, called the *lobe*. Its outer circle or border is called *helix*, and the semicircle within this, *antihelix*. The moveable cartilage placed immediately before the meatus auditorius, which it may be made to close exactly, is named *tragus*; and an eminence opposite to this at the extremity of the antihelix is called *antitragus*.

(550.) The CONCHA is a considerable cavity formed by the extremities of the helix and antihelix. The meatus auditorius, which at its opening is cartilaginous, is lined with a very thin mem-

brane, which is a continuation of the cuticle from the surface of the ear. The use of the external ear is to collect sounds, and direct them into the meatus auditorius, which is the passage that leads to the tympanum or drum. This passage is lined with a glandular membrane, in which also is some hair. The CERUMEN, or yellow wax, which is secreted by these glands, is diffused over this membrane, and serves to defend it from the drying qualities of the air, and also to entangle any insect that might otherwise get into the ear, and create much uneasiness. But indeed this seldom happens, as its bitterness generally prevents them. Sometimes this wax being separated in too great quantity, fills up the passage and causes deafness; while, on the other hand, the ear is liable to great discharges of matter from the meatus auditorius. These are commonly called imposthumes, but are probably nothing else than inflammation of the membrane we have described, and which cause an increased secretion from the glands.

(551.) At the farther extremity of the meatus auditorius lies the *membrana tympani*, which is extended upon a bony ridge almost circular. Its situation both in men and quadrupeds is nearly horizontal, inclined towards the meatus auditorius, which appears to be the best position for receiving sounds; as they generally are reverberated from the earth. In men it is concave outwardly but in birds it is convex, so as to place the upper side of it nearly perpendicular to the horizon, and render them more capable of hearing each other's sounds when aloft in the air, where there can be but little reverberated sound. This membrane does not entirely close the passage, but has on one side a small aperture covered with a valve. It has been found half open in persons who in the life-time had not been deaf; and instances have been known, of men who could force the smoke of tobacco through their ears, in which case it could only go from the mouth through the Eustachian tube, and through the tympanum; yet in these instances the hearing was perfect. Experiments on animals indeed have proved that we may break the tympanum in both ears, and yet not destroy the hearing, and only with the temporary inconvenience of strong sounds being for some time heard with a degree of pain and uneasiness. Indeed there is a case upon record, in which the tympanum of a man was destroyed by an ulcer, and the auditory bones cast out, and that without destroying the patient's hearing.

(552.) From these, and the like cases, it may be concluded, that the *membrana tympani*, though useful in hearing, is not the seat of that sense, and if any disease in that membrane should obstruct the passage of sounds to the internal part of the ear, an artificial passage, through the membrane, might restore the sense of hearing, and the removal of the opaque crystalline humour recovers sight. Many years ago, a malefactor was pardoned on condition that he submitted to this experiment; but he happened to fall ill of a fever which delayed the operation, and in the meantime there was so great a public clamour raised against it that the attempt was dropt.

(553.) This membrane in very young children is often covered with mucus; but whether this

[illegible]

As to be considered as a morbid appearance, or an
 necessary to prevent fluids from afflicting them
 too much, is uncertain. The father of four chil-
 dren born deaf was advised to lay bladders upon
 the heads of the next children he might have,
 which he did to three that were born afterwards,
 and every one of them heard well. It seems not
 unreasonable to suppose, that too great a quan-
 tity of this mucus upon the drum might be the
 cause of deafness in the four children; and that
 the discharge, made by the bladders in the latter
 case, was the cause of their escaping the like
 ail.

to 4, into the middle of the tympanum is extended a small bone called *malleus*, from its resemblance to a hammer) whose opposite end is articulated to a bone called *incus*, from its likeness to an anvil, which latter bone is also articulated by the intersection of an exceedingly small and slender process, to a fourth bone called *stylus*, from its resemblance to a pin. These bones are contained in that cavity between the tympanum, which is called the barrel of the ear; by its name it admits not the barrel only *tympanum*, but the membrane, *membrana tympani*. The malleus, being moved forward by the muscles *obliquus externus*, of *tracheus*, extends the tympanum so that it may be more firmly affected by the fluids it bounds, when they are too weak. This is done by a very cartilaginous part of the *obliquus externus* and *obliquus internus* muscles, proper, one is reflected under a small process, and three pass on, perpendicular to the tympanum, to be inserted into the handle of the malleus, sometimes with a double tendon.

355) Another exterior of the tympanum, called *Stapes externus*, lies parallel to it. It is 2 miles from the outer and upper part of the *Stapes internus*, and passing through the foramen with the *Stapes internus*, it enters the branch of the fifth pair of nerves, it is inserted into a stout process of the malleus. This is not obviously an extremity as to be known to be fit, and not to expel noise. The muscle which enters the membrane is called *extensor tympani*. From the upper part of it a auditory part of the *Stapes internus*, which has that character, and is inserted into the *Stapes internus* muscle. The relaxation of the tympanum is made by this muscle, without our knowledge, when sounds are too strong; and, as the pupil is there restrained, when we have too much light, and dilated when there is too little, so the ear is too low, or the tense of hearing is too much, the *Stapes internus* is so effected, as to make the auditory foramen close, or the ear is in the case of a common drum, or the works of any musical instrument.

454) From the cavity behind the tympanum, which is called the barrel of the ear, goes this *musculus tensor*, or *musculus palatum*; it ends *transversim* behind the *pauca*. This passage seems to be exactly of the same size with the hole in the side of the common drum, that is, to let the air in and out from the barrel of the ear to make the membrane vibrate the better; and perhaps, so the ear, which is closer than a common drum, to let air in or out as it alters in drum

hurry, and any wind should be separated from the ear, to give a passage to that. This tube, when obstructed, at sometimes happens from the growth of a polypus behind the eardrum, occasions great difficulty of hearing. Sometimes, on the other hand, when the meatus auditorius is obstructed, a man, by opening his mouth wide, will hear well through this passage; which is often so done, on speaking in water through the nose, it admits into the canal of the ear, and causes a temporary deafness. To prevent this, we take this way, it is only necessary to stop the ears, and take between the right side end of a wire, or chord, that will vibrate well, and holding the other end, strike it, and the sound that be hears, will be received through this passage.

(551.) THE STAPES has a muscle, called *musculus stapædis*, it lies in a long channel, and ending in the stapes, serves to pull the flaps of the fenestra ovalis, which, otherwise, it covers. Besides the fenestra ovalis, there is near it another, somewhat smaller, called *rotunda*. These two holes lead to a cavity, called a *hygroma*, which opens into other cavities, apply *canalis cochleæ*, and three semicircular canals, altogether named the *labyrinth*, in which are spread the auditory nerves, to receive and convey the impulse of sounds to the brain. Besides these, the *chorda tympani*, which is a branch of the fifth pair of nerves, may also convey these sensations to the brain.

(55) The two holes, called *FENESTRA OVALIS*, and *ROTORUM*, are cloied with a fine membrane, like that called the *drum*, and the larger, being occasionally covered, and uncovered, by the *musculus tensor tympani*, is intended for use, as it will convey the purposes of hearing; and the advantage being added to that of a fix or to its tympanum, the effect of sounds may be greatly increased or lessened upon the auditory nerves, expanded in the labyrinth. In the conduct of the *fenestra ovalis*, the *fenestra rotunda*, the *fenestra ovalis convexa*, and for the lower, the *tympanum* may be tense, and the *funiculus* uncovered. If sounds, propagated in the ear, were heard less, we might often be in danger before we were apprized of its state; and the organs of the hearing, which are so delicate, and so easily deranged, were to lose, we should commonly hear more things at once than we could attend to.

(59g) The *stusus* of *h. r. n.*, in producing which all the parts we have defined already, as occasioned by a certain modulation of the air, collected by the funnel like fluge of the extrinsic, and conveyed through the acetate and diaphragm, is propagated by means of the air, is very easily proved, by ringing a bell, under the receiver of an air-pump; the sound it affords, being found to diminish gradually, as the air becomes exhausted, till at length it ceases to be heard at all. Sound moves through the air, with infinite velocity; but the degree of its motion seems to depend on the state of the air, and is, consequently, more rapid in the dense, and slower, than it does in a more and rarefied air. See *Acoustics*.

(60a) That the vibrating on the membrane (vibrant), comm. u. is the vibration to the

Different parts of the labyrinth, and by means of the fluid contained in this cavity, affects the auditory nerve, so as to produce sound, seems to be very probable; but the situation, the minuteness, and the variety of the parts which compose the ear, do not permit much to be advanced, with certainty, concerning their mode of action. Some of these parts seem to constitute the immediate organ of hearing, and these are all the parts of the vestibulum: but there are others, which seem intended for the perfection of this sense, without being absolutely essential to it, as appears from the instances above mentioned.

(561.) Sound is more or less loud, in proportion to the strength of the vibration; and the variety of sounds seems to depend on the difference of this vibration; for, the more quick and frequent it is, the more acute will be the sound, and *vice versa*. Before we conclude this section, it will be proper to explain certain phenomena, which have a relation to the organ of hearing.

(562.) There are few people, who have not, in consequence of particular sounds, occasionally felt that disagreeable sensation, which is usually called *setting the teeth on edge*. The cause of this sensation may be traced, to the communication which the *portio dura* of the auditory nerve has, with the branches of the 5th pair, that are distributed to the teeth, being probably occasioned by the violent tremor, produced in the *membrana tympani*, by these very acute sounds. Upon the same principle, we may explain the strong idea of sound, which a person has, who holds a vibrating string between his teeth.

(563.) The humming, which is sometimes perceived in the ear, without any exterior cause, may be occasioned, either by an increased action of the arteries in the ear, or by convulsive contractions of the muscles of the malleus and stapes, affecting the auditory nerve in such a manner as to produce the idea of sound. Mr Elliot, in his *Philosophical Observations on Hearing*, says, that there are sounds liable to be excited in the ear, by irritation, and without any assistance from the vibrations of the air.

SECT. VI. Of Seeing.

(564.) The organs of the sense of SEEING, are divided into two parts: viz. the INTERNAL, which is the globe or body of the eye; and the EXTERNAL, which comprehends all those parts, surrounding the globe, and subservient to it. The EYES are situated in two bony cavities, named ORBITS, where they are surrounded by several parts, which are either intended to protect them from external injury, or to assist in their motion. These orbits have all their vacant spaces filled with a loose fat, which serves as a proper socket for them to move or rest in.

(565.) The globe of the eye is immediately covered by two PALPEBRÆ, or eye-lids, which are composed of muscular fibres, covered by the common integuments, and lined by a very fine and smooth membrane, which is from thence extended over part of the globe of the eye; and is called *tunica conjunctiva*. Each eye-lid is cartilaginous at its edge; and this border, which is cal-

led *tarsus*, is furnished with a row of hairs, named CILIA, or *eye-lashes*.

(566.) The CILIA serve to protect the eye from insects, and minute bodies floating in the air, and likewise to moderate the action of the rays of light, in their passage to the retina. At the roots of these hairs, there are sebaceous follicles, first noticed by Meibomius, which discharge a glutinous liniment. Sometimes the fluid they secrete has too much viscosity, and the eye-lids become glued to each other.

(567.) The upper border of the orbit is covered by the SUPERCILIA, or eye-brows, which, by means of their two muscles, are capable of being brought towards each other, or of being carried upwards. They have been considered as serving to protect the eyes, but they are probably intended more for ornament, than utility. It is observable, that the eye-brows are peculiar to the human species. The inner angle of each orbit, or that part of it which is near the nose, is called CANTHUS MAJOR, or the *great angle*; and the outer angle, which is on the opposite side of the eye, is the CANTHUS MINOR, or *little angle*.

(568.) In the upper and outer part of the orbit, is seated, the LACHRYMAL GLAND. Its use is, to furnish a watery secretion, called the tears, which answer the end of washing off dust, and keeping the outer surface of the eye moist, without which, the transparent *cornea* would be less pellucid, and the rays of light disturbed in the passage to the retina; and that this liquor may be rightly disposed of, we are continually closing the eye-lids, to spread it equally, even when we are not conscious of doing so. At the inner corner of the eye, between the eye-lids, is a little reddish body, called *caruncula lachrymæ*, which seems placed there, to keep that corner of the eye-lid from being totally closed, as to hinder the discharge of tears or gummy matter from the eye-lids, during sleep. Close to this caruncle, are situated, the *puncta lachrymalia*, which are little holes, one in each eye-lid, designed to carry off the superfluous tears into the *ductus ad nasum*.

(569.) The TUNICA CONJUNCTIVA is the first membrane of the eye. It covers so much of the eye, as is called the white, and being reflected from the eye, to the inside of the lids, it effectually hinders any extraneous bodies from getting behind the eye, into the orbit, smooths the parts it covers, and thus renders the friction less between the eye and the eye-lids. This coat is very full of blood vessels, as appears when it happens to be attacked with inflammation.

(570.) The TUNICA SCLEROTICA, is everywhere white and opaque, and is joined, its anterior edge, to another coat, which has more convexity, than any other part of the globe, and being exceedingly transparent, and somewhat like horn, is called CORNEA.—Some writers, who have given the name of *cornea* to all this outer coat, have named what is hard and most commonly called *sclerotica*, *cornea opaca*; and its anterior and transparent portion *cornea lucida*. These two parts are perfectly different in their structure; so that some anatomists suppose them to be as distinct from each other

talline humour in the former case, and a less convexity in the latter, it is difficult to imagine, according to the laws of optics, how we could so distinctly see objects at different distances.

(579.) It has been insisted by some writers, that fish are able to draw their crystalline humour nearer to the bottom of the eye, when they are out of the water, and to throw it forwards when in the water; because the rays of light are less refracted in passing from water through the crystalline humour than from air. On the motions of this part in the subject indeed, a new opinion has been advanced by Mr Hunter, who, in the crystalline humour of the eye in many animals, but particularly in the cuttle fish, discovered a laminated and something like a muscular structure. By this kind of mechanism it is supposed, that instead of approaching or receding to accomodate itself to different distances, the crystalline possesses a power of augmenting or diminishing its convexity. But this doctrine wants confirmation.

(580.) Behind the aqueous humour lies the **CRYSTALLINE**. Its shape is that of a depressed spheroid; and it is distinctly contained in a very fine membrane or capsule called *aranea*. This humour being somewhat solid and of a convex form, has the effect of refracting the rays of light which pass through it; so that each pencil of rays from the same point of any object, may be united upon the retina, similar to what happens in a camera obscura. As transparent bodies refract the rays of light, not only in proportion to their convexity, but also in proportion to their different densities, whenever the crystalline humour is removed in the operation for the cataract, the aqueous possesses its place and becomes a lens; but that refracting light less than the crystalline, the patient needs a *convex* glass before he can see accurately.

(581.) In some eyes, either this humour being too convex or too distant from the retina, the rays unite too soon, unless the object is held very near to the eye; and this fault is remediable only by a glass of an opposite sort, viz. by a *concave* glass, as the contrary fault, common to old persons, is by a *convex* glass. Had the eye been formed for a nearer view, the object to be viewed would often obstruct the light; if, for a more distant view, light enough would not commonly be produced from the object to the eye. In fish the crystalline humour seems a perfect sphere, which is necessary for them, because light being less refracted from water through the crystalline humour than from air, that defect is compensated by a more convex lens.

(582.) The **VITREOUS HUMOUR** is a gelatinous transparent body, which lies behind the crystalline, and fills up the greatest part of the globe of the eye. Its fore side is rendered concave by the impression of the crystalline, and its back side convex, in consequence of the globular shape of the organ. It serves as a medium to keep the crystalline humour and the retina at a due distance, and to transmit the rays of light which are reflected from external objects.

(583.) The eye receives its arteries from the internal carotid, through the foramina optica, and veins pass through the foramina lacera, and

empty themselves into the external jugulars. Besides the optic nerve which enters at its posterior part, the eye receives branches from the 3d, 4th, 5th, and 6th, pair of nerves.

(584.) The humours of the eye, together with the cornea, are calculated to refract and converge the rays of light in such a manner as to form at the bottom of the eye a distinct image of the object we look at; and the point where these rays meet is called the *focus* of the eye. On the retina, as in a *camera obscura*, the object is painted in an inverted position; and it is only by habit that we are enabled to judge of its true situation and likewise of its distance and magnitude.

(585.) This is the generally received philosophical doctrine upon the subject of optics; but it is a doctrine from which we cannot help expressing our dissent, because hypothesis is here not only unsupported by fact, but placed in *direct opposition* to it. In this, as well as in the former supposition, (§ 575) that we would see objects *double*, did not experience, and judgment convince us, that they are single, we suspect too great a compliment is paid to *judgment* and *habit*. At what period of life, we would ask the supporters of these doctrines, does a child begin to exercise this degree of *judgment*, that they alledge is necessary, to correct the mistakes of his sense of seeing? And what is the reason, if the doctrine be true, that none of us can recollect the time, when we *really* saw people walking with their feet uppermost and every thing else turned upside down? As to our seeing objects double, because we have two organs of vision, and correcting the mistake by habit, it may as well be affirmed, that we hear every *sound* double, because we have *two ears*. Of this last hypothesis, which no philosopher has as yet ventured to broach, evidences might be brought from the well known fact of the reduplication of sounds by echoes, fully more decisive than any we have yet met with, in proof of the doctrine of *double or inverted vision*.

(586.) In short, those who support this theory seem to draw a false conclusion from a philosophical fact; and, in our opinion, to argue as absurdly, as an ignorant person would do, who knew nothing of printing, and who, upon being taken into a printing-office, and observing the types all set the backward way, should thence conclude, that books were really printed in an *inverted* form, but that learned men, by *habit* and *experience*, had acquired the art of reading them the right way. In all probability it is necessary to our seeing objects as they really are, that the images of these objects be painted on the retina inverted, as it is necessary to print a book properly, that the types be previously backward.

(587.) As for the anecdote related in proof of this doctrine, of the gentleman born blind, who was cured by Mr Cheselden, if it proves a thing, it only proves the sense of seeing to be a species of *feeling*. The supporters of these theories might as well quote the case of the blind man whom our Saviour cured, but who, before his cure was quite completed, "saw men as *resembling* walking." The anecdote is as follows: "The young gentleman who was born blind, and who



ANATOMY.

PL. IX.

Fig. 3. Androgynæ.

Fig. 1. Gall-Bladder &c.



Fig. 11.
ATINGA GUARU-MUCU.



Fig. 8. ASTROLABE.



Fig. 6. Argonauta Argo.



Fig. 5. Anguis Maculata.

AORTA, description of the, 392, 393—401.

APONEUROSIS, explained, 181.

APOPHYSIS, defined, 100.

APPENDICES epiploicæ, described, 273.

AQUAPENDENTE, AB, Fabricius discovers the valves in the veins, 32.

ARABIANS, the preservers of science, 19. their learning for a long time, the only literature in Europe, 21.

ARACHNOIDES, tunica, described, 465.

ARCHAGATHUS, the 1st Greek physician in Rome, 16. banished, ib.

AREOLA, description of the, 341.

ARETÆUS, account of his writings, 16.

ARISTOTLE, his writings long lost to the public, 14. and corrupted by transcribers, ib.

ARM, bones of the, 148, 149.

ARTERIES, defined, 88. description of them, 390—410.

ARTHRODIA explained, 103.

ARTICULARIS, nerve, the course of the, 506.

ARTICULATION, definition and divisions of, 103.

ASCLEPIADES, a famous anatomist, 16. his discoveries, ib.

ASELLIUS discovers the lacteal vessels, 35.

ATHEISM, anatomy an antidote against, 55, 56, 57. yet not always successful, 58.

ATHENS, the decline of science in, 14.

ATHOTIS, K. of Egypt, an ancient anatomist, 5.

AURELIANUS, C. an anatomical author, 16.

AURICLES of the heart, described, 375, 376.

AZYGOS, described, 406.

AZYR, M. V. d' publishes elegant plates of the brain, 49.

B.

BARTHOLINE, Th. discovers the lymphatic vessels, 37.

BELL, Mr Andrew, publishes an elegant system of anatomy, 49.

BELLINUS, L. introduces mathematical reasoning into physics, 40.

BELLY, Lower, See ABDOMEN.

BENEDICTUS, an improver of anatomy, 27.

BERENGARIUS, a teacher of anatomy, 27.

BIDLOO, Prof. publishes anatomical plates, 41. Cowper steals the work, ib.

BLIND, persons born, acquire great powers of feeling, 534.

anecdote of one, 587. remarks on it, 588.

BLOOD, Plato's description of the, 11. circulation of the, discovered, 32. supposed to be possessed of a living principle, 382. is not a homogeneous fluid, 383. consists of different substances, ib. 384. its nature investigated, ib. 385. chemical experiments with it, 386. proofs of its circulation, 387, 388.

BLOOD VESSELS. See ARTERIES and VEINS.

BONE, definition of a, 82.

BONES, intention and uses of the, 95. of the cranium, face, &c. See OSTEOLOGY.

BORELLI, Dr, his calculation of the force exerted by the heart, 380.

BRAIN, description of the, 457, 458, 466—472.

BREASTS, description of the, 336—346.

BRONCHIAL arteries, described, 399.

BURSÆ MUCOSÆ, chiefly discovered by Dr Monro, 114. described, ib.

C.

CÆCUM, description of the, 291.

CÆLIAC arteries, described, 399.

CAROTID arteries, described, 394, 395.

CARTILAGES defined, 83. uses of, 166. described, 167, 168.

CASSIUS, his anatomical discovery, 16.

CAVÆ VENZÆ, origin of the, 403, 406, 407.

CAUDA EQUINA, described, 472.

CELLULAR interstices and membrane described, 234.

CELSUS, an ancient writer on anatomy, 16.

CEPHALIC vein account of the, 405.

CEREBELLUM, described, 469.

CEREBRUM, described, 466.

CERVICAL arteries, description of the, 396.

CERVICAL nerves, described, 497—500.

CERVICAL sinuses, account of their course, 464.

CERVICAL veins, description of the, 404.

CHARLES V. orders a consultation of divines, respecting dissection, 22!

CHESLDEN, Dr, publishes anatomical plates, 48.

CHYLE, the passage of the, discovered, 35, 36. the receptacle of described, 429.

CILIA, described, 556.

CIRCULATION of the blood, the rudiments of the, known to Plato, 11. discovered by Harvey, 32. advantages of it, 33. is opposed, 34. but at last universally received, ib. explained, 66.

COATS of the lymphatics described, 417. of the lacteal sac and duct, 432.

COLON, description of the, 29.

COLUMBUS, a celebrated anatomist, 29.

CONDYLE, defined, 101.

CONSTANTINOPLE, the sack of favourable to anatomy, 2.

CONCEPTION, various hypotheses respecting, 324—327.

CONGLOBATE glands defined, 251. constitute a part of the lymphatic system, 419. description of them, ib.

CONGLOMERATE glands defined, 252.

CORNEA of the eye described, 570.

CORONARIÆ cordis, description of the, 393.

CORPUS ADIPOSUM of the breast described, 339.

CORPUS CALLOSUM of the brain description of the, 466.

CORRIE, Dr, asserts the vitality of the blood, 382.

CORTESIUS, his character Mündin, 21. his difficulty of procuring subjects for dissection, 31.

COWPER, plagiarises Dr Bidloo's plates, 41.

CRANIUM, bones of the, 118, 125. muscles of the, 192.

CRASSAMENTUM, described, 383. experiments with, 384, 385.

CRUICKSHANK traces the rarefaction of the absorbents, 1.

CRYSTALLINE humour of the eye, described, 578, 580.

CUBITALES arteriæ, description of the, 398.

CUTANEOUS glands described, 231.

CUTANEOUS nerve, course of the, 501.

CUTICLE, described, 227.

CUTIS, described, 229.

D.

DECIDUA, the, discovered, 1.

DEITY, the existence of a, proved by anatomy, 55, 56.

DEMOCRITUS, the first dissection we know of, 12.

DES CARTES, his opinion of the seat of the soul, 468.

DIAPHRAGM, description of the, 347—349. its uses, 348, 349.

DIAPHRYSIS, defined, 100.

JEWS, no cultivators of anatomy, 9. the reason, *ib.*

ILIAC PASSION, cause of the, 298.

ILIAC REGIONS delineated, 267.

ILIUM, description of the, 290.

INCUS of the ear described, 554.

INFUNDIBULUM described, 466.

INJECTIONS invented, 51.

INTEGUMENTS, the common, enumerated, 226. and described, 227—234.

INTEGUMENTS of the brain, 459—465.

INTERCOSTAL arteries, description of the, 399.

INTERCOSTAL nerve, origin of the, 485, delineated, 493, 494.

INTESTINAL canal, description of the, 286—296.

INTESTINES described, 295, 296.

INTRODUCTION, 1—94.

INTRODUCTORY observations, 223, 333, 389.

IONIAN School, natural knowledge cultivated in, 9.

IRIS of the eye, described, 571.

K

KEILL, Dr, an eminent anatomical author, 50. his estimate of the force exerted by the heart, 380.

KIDNEYS, description of the, 303.

KNEE BONE described, 156.

L

LABYRINTH of the ear described, 557.

LACERTULI defined, 181.

LACTEAL SAC and DUCT, description of the, 429—432.

LACTEAL vessels discovered, 35. account of them, 411, 412, 414, 429, 437—439.

LANCISI, the Popes physician, discovers Eustachius's plates, 30, and publishes them, *ib.*

LARYNX, account of the, 354.

LEG, bones of the, 157. muscles on the, 217.

LIEN: See **SPLEEN**.

LIEWENHOECK, Ant. improves the microscope; 43. his discoveries, *ib.*

LIFE, a principle of, in the blood, a doctrine advanced by Harvey, 382. and supported by Mr Hunter and Dr Corrie, *ib.*

LIGAMENTS, definition of, 84, 113. uses of, 166. various, described, 170—176.

LINGUAL glands defined, 258.

LIPS, muscles of the, 197.

LIVER, description of the, 299.

LONGINUS, a quotation from, 11.

LONGITUDINAL sinuses in the dura mater, 461, 462.

LUDWIG, his opinion of the nails, 235.

LUMBAR nerves delineated, 508—512.

LUMBAR region defined, 267.

LUNGS, description of the, 359, 360.

LYMPHATIC vessels discovered, 37, 44. controversy concerning them, 45, 46. description of them in general, 413—419. and in particular parts, 420—428. 433—436. 440—450.

M

MAHOMETAN superstitions prevent anatomical improvement, 20.

MALLEUS of the ear described, 554.

MALPIGHI publishes on generation, 40. the minutiae of anatomy, *ib.* and the lungs, *ib.* his opinion of the origin of the nails, 235.

MAMMÆ, description of the, 336—346.

MANETHO, quoted, 5.

MANGETUS, a writer on anatomy, 59.

MARCELLINUS quoted, 15.

MARROW, uses of the, 98.

MASSA, an improver of anatomy, 27.

MATER. See **DURA** and **PIA**.

MAXILLARY glands described, 255.

MAXILLARY nerves delineated, 483, 484.

MECKEL, Dr, publishes on the lymphatics, 44.

MEDIASTINUM, description of the, 352. its use, 353.

MEDULLA oblongata, description of the, 471.

MEDULLA spinalis, defined and delineated, 472.

MEMBRANA adiposa described, 233.

MEMBRANE, definition of a, 86.

MEMBRANES, in general, description and uses of the, 245, 246.

MESENTERIC arteries, description of the, 400.

MESENTERY described, 297.

MICROSCOPES used by Malpighi, 40. improved by Liewenhoeck, 43.

MILK, analysis of the, 346.

MOLARES, glandulæ, described, 257.

MONRO, Dr, jun. publishes on the lymphatics, 45. proves them to be absorbents, *ib.* on the nerves, 48. and bursæ mucosæ, *ib.* has discovered most of these, 114. his arguments against the vis insita, 515—

524. and in favour of the vis nervea, *ib.* experiments with frogs, 519, 520.

MONRO, Dr, sen. an eminent anatomical author, 50.

MORGAGNI, a writer on anatomy, 48, 59.

MOUTH, bones of the, 135. muscles of it, 197.

MUCOUS glands, definition of, 250.

MUNDINUS, author of a system of anatomy, 21. which was much esteemed in Italy, *ib.*

MUSCOVY, anatomy prohibited in, 22.

MUSCLES, first named by Vesalius, 29. defined, 91, 180, 181. their irritability, 190. tables of them, 192—219. notes on, 219.

MUSCLES, involuntary, defined, 180.

MUSCLES, penniform, described, 185.

MUSCLES, rectilinear, defined, 184.

MUSCLES, voluntary, distinguished, 180.

MUSCULAR fibres, definitions of, 85, 181.

MUSCULAR motion, theories of, 183. estimates of the power of, 186, 187.

MUSCULAR nerve delineated, 503.

MUSCULO-CUTANEUS nerve, description of the, 502.

MYOLOGY, definition of, 77. the muscles in general, 180, 190. of particular muscles, 192—219. See **MUSCLES**.

N

NAILS, the, described, 225. parts and uses of, 236.

NECK, muscles of the, 199, 209.

NERVEA, vis, account of the, 513—526.

NERVES defined, 89, 473. description of them, 473—512. their size, 474. ganglions, 475. order of dissecting them, 476.

NERVOSA, vis. See **NERVEA**.

NEUROLOGY defined, 77. system of, 457—526. of the brain in general, and its interments, 457—465. the cerebrum, cerebellum, and medulla oblongata and spinalis, 466—472. of the nerves, 473—512. and the vis nervea, 513—526.

NICHOLLS, Dr, his improvement of preparations, 52.

NIMESIVS, his anatomical discoveries, 18.

NIPPLE, description of the, 3

DURA MATER, described, 461—464.
SKELETON, a brazen, consecrated to Apollo by Hippocrates, 12. description of the, 115. bones of the, 178.
SKELETONS, the use of, condemned, 22.
SKIN, description of the, 229, 232.
SMELLING, the sense and organs of, described, 542—547. accounted for, 543—546.
SOCRATES, the improver of philosophy, 10.
SOLIDS, anatomy of the, defined, 76.
SOLOMON, supposed to have been versant in anatomy, 5.
SOUL, opinions concerning the seat of the, 468, 490.
SPERMATIC ARTERIES, origin of the, 400.
SPINAL MARROW, description of the, 472.
SPINAL NERVES, number and arrangement of the, 496. description of them, 497—512.
SPINE, muscles on the, 210.
SPLANCHNOLOGY, defined, 77, 264. of the abdomen and its general contents; 264—268. the peritonæum and omentum, 269—276. alimentary canal, stomach, and intestines, 277—296. mesentery, liver, gall bladder, pancreas and spleen, 297—302. kidneys, ureters, urinary bladder, and glandulæ renales, 303—306. male generative organs; 307—315. female ditto, 316—323.
SPLEEN, description of the, 302.
STAPES of the ear described, 557.
STENO, a writer on generation, 39.
STOMACH, description of the, 279—281.
SUBCLAVIAN ARTERIES, account of the, 397.
SUBLINGUAL GLANDS, described, 256.
SUBSTANCE of the brain, divisions of the, 470.
SUPERSTITIONS, Jewish, and Mahometan, inimical to anatomy, 20. Christian almost equally so, 22, 31.
SURGERY, founded on anatomy, 59.
SUTURE, definition of a, 104, 116. the coronal, &c. described, 116.
SWAMMERDAM, Dr, publishes on generation, 39. anatomy, 41. and respiration, ib. disc-

covers an art of preserving bodies, ib.
SWEAT, nature and qualities of, 240.
SYLVIVS, a celebrated anatomist, 29. defends Galen, 1b.
SYMPHYSIS explained, 106.
SYNARTHROSIS, definition and divisions of, 104.
SYNCHONDROSIS defined, 106.
SYNEUROSIS explained, 106.
SYNOVIA, described, 177. See **GLANDS**.

T

TASTES, variety of, inquiry concerning, 537, 538.
TASTING, the sense of, described, 535—541. cause of it, 536. accounted for, 537.
TEETH, number of the, 135. names and division of, ib. phenomena respecting them, ib. 562.
TESTES, description of the, 308.
THALES, a cultivator of natural knowledge, 9.
THEOPHRASTUS, Aristotle's works used by, 14. the teacher of two celebrated Anatomists, 15.
THIGH, muscles on the, 215, 216.
THIGH-BONE, described, 155.
THORACIC DUCT discovered, 36.
THORAX, muscles of the, 207, 208. its extent and contents, 334, 335, and coverings, 336, 346.
THYMUS, description of the, 263.
THYROID GLANDS described, 261.
TINÆ OS, described, 321.
TOES, bones of the, 164, 165.
TONGUE, description and uses of the, 535, 540, 541.
TOOTH-ACH, the seat of the, 135.
TOUCH, erroneously used for the sense of Feeling, 529. is only the active exertion of that sense, 532. cause of it, 533. surprising degree of delicacy acquired in it by some, 534.
TRACHEA, description of the, 354—358.
TRUNK, bones of the, 137—145. muscles between the, and the os hyoides, 200. muscles of the, 209. general division of the, 224, 225.
TUNICA ARACHNOIDES, described, 465.
TYMPANUM of the ear, description of the, 551—555, 558.

U V

VAGINA, description of the, 319.

VAGUM PAR, delineated, 489, 490.
VALSALVA, Dr, publishes anatomical plates, 48.
VALVES in the veins discovered, 32. in the ventricles of heart, 372, 373.
VAN HELMONT, his opinion of the seat of the soul, 490.
VAN HORN, a writer on generation, 39.
VASA DEFERENTIA, described.
VASSARE, his account of L. Vinci, 24, 25, 26.
VATER, Dr, publishes anatomical figures, 48.
VEINS, origin of the, 403. descriptions of the principal, 404—409.
VENERIS MONS, described, 3.
VENTRICLES, of the heart, described, 370—374.
VENTRICULUS. See **STOMACH**.
VERHEYEN'S doctrine of mammary glands, 231.
VERTEBRÆ, muscles close to the, 205.
VESALIUS, a great anatomist, his exertions, ib. corrects Galen, ib. is opposed, 29. gives names to the muscles, ib.
VESTIULÆ SEMINALES, description of the, 310.
VESSELS, definition of, 87. division of, ib. See **ARTERIES**, **LACTEALS**, veins.
VESTIBULUM of the ear described, 557.
VINCI, DA, LEON. an anatomical painter, account of, 25, 26.
VIT INSITA, a doctrine of F. Mercurius, 190, 515. disputed, ib. **Monro's** arguments against, 516—524.
VIS NERVEA, disquisition concerning the, 523—526.
VISION DOUBLE, supposed to be corrected by habit, theory disputed, 585. proved false, 588.
VISION INVERTED, theory, 584. supposed to be corrected by habit, ib. this doctrine disputed, 585, 586. and proved false, 588.
VISCERA, definition of, 94.
VITREOUS HUMOUR of the eye described, 578, 582.
ULNA. See **ARM**.
ULNAR NERVE, course of, 504.
UMBILICAL REGION described, 225, 267.
VOICE, formed by respiration, 366.
URETERS, description of, 304.

FASTER, account of the, 314.
 GIBBY bladder, described,
 30.
 GIBBY, description of the, 321.
 GIBBY glands, described, 259.

W

WALTER, Dr publishes on the
 48.
 WALTER, preparations injected with,
 extremely useful in anatomy,
 account of them, ib. 53.

WAX-WORK representations in,
 carelessly executed, 53.

WEIDBREICHT, Dr, publishes
 on the bones and joints, 48.

WIND-PIPE. See TRACHEA.

WINSLOW, Dr, an eminent a-
 natomist, 50.

WITCHCRAFT, the use of ske-
 letons reckoned subservient to,
 22.

WRIST, bones of the, 152.

X

XENOPHON, his anatomical de-
 scriptions, quoted by Longi-
 nus, 11.

Z

ZIMMERMAN, Dr, an eminent
 writer on anatomy, 48.

ZINN, Dr, publishes a work on
 the eye, 48, 570.

ANATOMY, in chemistry, is used for the ana-
 lysis of mixt bodies. In this sense the chemists
 call their art *anatomia spagyrica*, spagy-
 ric anatomy. accordingly they speak of the
 anatomy of vitriol, of sulphur, &c.

ANATOMY OF BRUTES. See COMPARATIVE
 ANATOMY.

ANATOMY OF PLANTS may be considered as a
 branch of comparative anatomy, otherwise called
phytoanatomy. The parts of plants which come un-
 der anatomical consideration are, the roots, wood,
 bark, pith, fruit, leaves, flowers, &c. The a-
 natomy of vegetables is chiefly owing to the in-
 vention of Malpighi, and Dr Grew, though con-
 siderably promoted by Ruysch, who by a pecu-
 liar method of injection produced divers ske-
 letons or systems of vessels of fruit, leaves, and the
 like. Something of the same kind has also been
 done by Thummingius. Some make F. Fabri the
 father of this science; and alledge that Malpighi
 borrowed many of his discoveries from him. Dr High-
 more in his book of Generation, Dr Sharrock on
 the propagation of plants, and Dr Hook in his
 Micrographia, have also given some observations
 on this way, though only collaterally. See
 PLANTS.

ANATRIPSIS, [from *ana* and *tripsis*, I wear,]
 a term in medicine, denotes friction. The word
 is sometimes written simply triplis.

1. ANATRON. *n. f.* The scum which swims
 upon the molten glass in the furnace, which, when
 blown off, melts in the air, and coagulates into
 common salt. It is likewise that salt which ga-
 thers upon the walls of vaults.

2. ANATRON, skimmed from glass, as above de-
 scribed, is the same with what others call *fel vitri*,
 or salt of glass.

3. ANATRON, or NATRON, a kind of native salt-
 petre, or nitre, found in Egypt. It is of a cineri-
 ous colour, and bitter taste, approaching to sal-
 tetric. It is the produce of a huge lake, on
 the surface of which it is gathered, in form of a
 crust.

4. ANATRON is also a compound salt, made of
 chalklime, alum, vitriol, common salt, and nitre;
 and as a flux to promote the fusion and purifica-
 tion of metals.

5. ANATRON is likewise used for the *terra fara-*
fracta; of which there are several kinds, black,
 red, and blue.

ANATROPE, [from *anatrepein*, to sub-
 vert;] a subversion or relaxation of the stomach,

attended with the loss of appetite, vomiting, and
 nausea.

ANATTOM, one of the New Hebrides Islands,
 in the South Sea. Long. 170. 9. E. Lat. 20. 10. S.

ANAUDI, those who are dumb. See next ar-
 ticle.

ANAUDIA, among naturalists, denotes dumb-
 ness, or a want of the use of speech. *Anaudia*
 is by some, made to differ from *apbonia*, as the
 former is owing to a defect of the nerves of the
 tongue, the latter to that of the nerves of the
 larynx. Infants and mutes are *anaudi*, *anauden*, not
apboni, *apbonen*.

ANAVINGA, in botany, a tree of a middle
 size, that grows in Malabar in the East Indies,
 especially about Cochin. It is an evergreen, and
 its fruits and berries are ripe in August. The
 juice of the berries drank, excites sweat, cures ma-
 lignant distempers, and keeps the body open.
 A decoction of the leaves in water makes a fit
 bath, for such as are afflicted with pains in the
 joints.

ANAUMACHION, [from *a*, negative, *navis*, a
ship, and *μαχημα*, I fight,] in antiquity, the crime
 of refusing to serve in the fleet.

ANAX, in ancient writers, denotes a hero, or
 demigod. The word seems formed of the He-
 brew *ananim*, or *enanim*, which signifies the same.
 Some will have it originally to import giants, cal-
 led also *gigantes*, earth-born. See ANAK. Cicero
 says, that the three eldest sons of Jupiter, called
Διότιδες, were also demoninated *anaces*.

ANAXAGORAS, one of the most celebrated
 philosophers of antiquity, was born at Clazomene
 in Ionia about the 70th Olympiad. He gave up
 his patrimony, to be more at leisure to study phi-
 losophy. He went first to Athens, and taught elo-
 quence; after which, having put himself under the
 tuition of Anaximenes, he gave lessons in philoso-
 phy; but only to particular friends and disciples,
 and with extreme caution. This did not prevent,
 but rather occasioned his being accused of impiety,
 and thrown into prison, notwithstanding the in-
 fluence of Pericles, his disciple and intimate. Ha-
 ving been condemned to exile, he opened school
 at Lampacus, where he was extremely honour-
 ed during the remainder of his life, and still more
 after his death. See next article. He is said to
 have wrote upon the phenomena of nature. His
 principal tenets were, that,—All things were in
 the beginning confusedly placed together, without
 motion; that the principle of things is at the same
 time

time one and multiplex, which he therefore called *homamerics*, or similar particles, deprived of life: That besides this there existed from all eternity, another principle, an infinite and incorporeal spirit, who gave the particles a motion; that such as were homogeneal united, and such as were heterogeneal separated: That in this manner, similar things, being united to such as were similar, such as had a circular motion produced heavenly bodies; the lighter particles ascended; those which were heavy descended; and the rocks of the earth, being drawn up by the force of the air, took fire, and became stars, beneath which the sun and moon took their stations. Thus he did not consider the stars as divinities. Neither did he doubt the immortality of the soul: for, being asked upon his death-bed if he wished to be carried back to his own country, "It is no matter," replied he, "for there is a *near cut to heaven* from every place."

ANAXAGORIA, in antiquity, a festival observed in honour of Anaxagoras. The occasion of its being instituted was this: Anaxagoras dying at Lampsacus, the magistrates of that city asked him, whether he desired any thing to be done for him? He replied, that on the anniversary of his death the boys should have leave to play.

ANAXANDRIDES, a comic poet of Rhodes, who flourished in the reign of Philip king of Macedonia, and wrote 65 plays.

ANAXARCHUS, a philosopher of Abdera, a follower of Democritus, and highly esteemed by Alexander the Great. His end was equally tragical and heroic. Having fallen into the hands of the enemy. Nicocreon, tyrant of Cyprus, ordered him to be pounded alive in a mortar; whereupon he replied—"Beat as thou wilt on the *bag* of Aristarchus, *himself* thou canst not hurt." On this the tyrant said he would cut out his tongue, whereupon the philosopher bit it off, and spit it at him.

ANAXIMANDER, a famous Greek philosopher, born at Miletus in the 42d olympiad. He was the first who publicly taught philosophy, and wrote upon philosophical subjects. He carried his researches into nature very far for the time in which he lived. It is said that he discovered the obliquity of the Zodiac, was the first who published a geographical table, invented the gnomon, and set up the first sun-dial in an open place at Lacedæmon. He taught, that infinity of things was the principal and universal element; that this infinite always preserved its unity, but that its parts underwent changes; that all things came from it; and that all were about to return into it. According to all appearance, he meant, by this obscure and indeterminate principle, the chaos of the other philosophers. He asserted, that there are an infinity of worlds; that the stars are composed of air and fire, which are carried in their spheres, and that these spheres are gods; and that the earth is placed in the midst of the universe, as in a common centre. He added, that infinite worlds were the product of infinity, and that corruption proceeded from separation. Materialism is also ascribed to him. See next article.

ANAXIMANDRIANS, the followers of A-

naximander. They are also nominated *hylopat* and stood opposed to the anatomists. They were the most ancient sect of philosophical atheists; they allowed of nothing in nature but bodies. These bodies they asserted, admit of qualities which produce and destroy each other, in a circle without beginning or end.

ANAXIMENES, an eminent Greek philosopher, born at Miletus, the friend, scholar, successor of Anaximander. He diffused some light upon the obscurity of his master's system. He made the first principle of things to consist in air, which he considered as infinite, and to which he ascribed a perpetual motion. He asserted, that all things which proceeded from it were defined and circumscribed; and that this air, therefore was God, since the divine power resided in it, and agitated it. Cold and moisture, heat and motion rendered it visible, and dressed it in different forms, according to the different degrees of condensation. All the elements thus proceeded from heat and cold. The earth was, in his opinion, one continued flat surface.

ANAXIMENES, the son of Aristocles of Lampsacus, an orator, the disciple of Diogenes the Cynic and of Zoilus the railer against Homer. He was preceptor to Alexander of Macedon, and followed him to the wars. Alexander being incensed against the people of Lampsacus, they sent a philosopher to intercede for them. Alexander, knowing the cause of his coming, swore that he would do the very reverse of whatever he desired of him. Anaximenes begged of him to buy Lampsacus and extirpate the inhabitants, or to sell them for slaves. Alexander unwilling to break his oath, and not able to elude this stratagem, pardoned the people of Lampsacus.

ANAZARBA, or ANAZARBUS, a town of Cilicia, on the river Pyramus, the birth place of Dioscorides, and of the poet Oppian. It was afterwards called *Cæsarea*, in honour of Augustus or Tiberius. It was destroyed by a dreadful earthquake, in the year 525, along with several other important cities: but they were all repaired at a vast expence, by the emperor Justin; who was so much affected with their misfortune, that putting off his diadem and purple, he appeared for several days in sackcloth.

ANAZARBEIS, or } The inhabitants of Anazarbeni, } zarba. See last article.

ANBAR, a town of Indostan.

ANBERTKEND, [in the Eastern Language literally, the *cistern of the waters of life*,] a celebrated book of the Brachmans, wherein the Indian philosophy and religion are contained. It is divided into 50 *beths*, or discourses, each of which consists of ten chapters. It has been translated from the original Indian, into Arabic, under the title of *Morat al-Maani*, i. e. the marrow of intelligence.

ANBLATUM, in botany. See APHYLLON. It is also named by Linnæus LATHRÆA, &c.

* ANBURY. *n. s.* See AMBURY.

ANCA, or ANCUS, in middle age writers, the thigh or hind leg.

ANCARANO, a town of Italy, in the pope's dominions, and march of Ancona, situated 5 m N

N. of Akoli, and 81 N. E. of Rome. Long. 13.

21. E. Lat. 41. 48. N.

ANCASTER, [Sax. from *an*, and *ceaster*, a city,] a town in Lincolnshire, under a hill, 8 E. from Grantham, and 15 South of Lincoln. While the Romans ruled in South Britain, it was called *Crocalana*, and was situated on the Roman highway. In those days it was very populous, and it still abounds with remnants of antiquity. There are large stone quarries in its neighbourhood, and the rocks lie very near the town. Long. 30. c. W. Lat. 52. 30. N.

ANCASTLE, a small town in Oxfordshire, on the borders of Berkshire.

ANGENIS, a town of France, seated on the Loire, in the department of Lower Loire, 20 m. E. of Nantes. Long. 1. 9. W. Lat. 47. 20. N.

ANCESTOR. *n. s.* [*ancestor*, Lat. *ancestrus*, fr. One from whom a person descends, either by the father or the mother. It is distinguished by *ancestor*; which is not, like *ancestor*, a natural, but a civil denomination. An hereditary monarch succeeds to his *ancestors*; an elective, to his *predecessor*.—

And she lies buried with her *ancestors*,
O, in a tomb where never scandal slept,
Save this of her's.

Shakespeare's Much ado about Nothing.
This was the paternal *ancestor* of Ninus, the father of Chus, the grandfather of Nimrod; whose son was Belus, the father of Ninus. *Raleigh.*

Obscure! why, pr'ythee what am I? I know
My father, grandfire, and great grandfire too:
If farther I derive my pedigree,
I can but guess beyond the fourth degree.

The rest of my forgotten *ancestors*,
Were sons of earth like him, or sons of whores.

Dryden.

ANCESTORS, ANCIENT HONOURS PAID TO.
Most nations have paid honours to their ancestors. It was properly the departed souls of their forefathers, that the Romans worshipped under the denominations of *lares*, *lemures*, and *household gods*. Hence the ancient tombs were a kind of temples, or rather altars, wherein oblations were made by the kindred of the deceased.

ANCESTORS, MODERN HONOURS PAID TO.
The Russians have still their anniversary feasts, in memory of their ancestors, which they call *rodina*, q. d. *kinsfolk's sabbath*, wherein they make annual visits to the dead in their graves, and carry them provisions, eatables, and presents, of many other kinds. They interrogate them, with lamentable cries, What they are doing?—How they spend their time?—What it is they do—and the like. The Quoijas, a people of the East, offer sacrifices of rice and wine to their ancestors, before they undertake any considerable action. The anniversaries of their deaths are always kept by their families with great solemnity. The king invokes the soul of his father and mother, to make trade flourish, and the chace successful.

ANCESTORS, WORSHIP OF, AMONG THE CHINESE. The Chinese seem to have distinguished themselves above all other nations, in the veneration they bear their ancestors. By the laws

of Confucius, part of the duty, which children owe their parents, consists in worshipping them when dead. This service, which makes a considerable part of the religion of the Chinese, is said to have been instituted by the emperor Kun, the fifth in order, from the foundation of that ancient empire. The Chinese have both a solemn and ordinary worship, which they pay their ancestors. The former is held regularly twice a-year, viz. in spring and autumn, with much pomp. One, who was present at it, gives the following account of the ceremonies on that occasion: The sacrifices were made in a chapel, well adorned, where there were six altars, furnished with censers, tapers, and flowers. There were 3 ministers, and behind them, 2 young acolytes. The 3 former went, with a profound silence, and frequent genuflexions, towards the five altars, pouring out wine: afterwards, they drew near to the sixth, and, when they came to the foot of the altar, half bowed down, they said their prayers, with a low voice. The ministers then went to the altar; the officiating priest took up a vessel full of wine, and drank; then lifted up the head of a deer or goat; after which, taking fire from the altar, they all lighted a bit of paper; and the minister of the ceremonies turning towards the people, said with a high voice, that he gave them thanks in the name of their ancestors, for having so well honoured them; and, in recompence, he promised them, on their part, a plentiful harvest, a fruitful issue, good health, and long life, and all those advantages that are most pleasing to men. The Chinese give their ancestors another simpler and more private worship. To this end, they have, in their houses, a niche or hollow place, where they put the names of their deceased fathers, where they put the names of their deceased fathers, and make prayers and offerings of perfumes and spices to them, at certain times, with bowing, &c. They do the like at their tombs. The Jews, settled in China, are said to worship their ancestors, like the heathens, and with the same ceremonies, except, that they offer not swine's flesh. Near their synagogues they have a hall, or court of ancestors, wherein are niches for Abraham, Isaac, &c. The Jesuits also conformed, and were permitted by their general, to conform to this, and many other superstitious customs of the Chinese. There is one peculiarity of another kind, wherein the Chinese show their regard for their ancestors; in proportion as any of their descendants are preferred to a higher degree or dignity, their dead ancestors are, at the same time, preferred and ennobled with them. The kings, Ven-Van, Veu-Van, and Cheu-Cum, who were descended from vassal kings, when they mounted the imperial throne, raised their ancestors, from the vassal state, wherein they had lived, to the dignity of emperors; so that, the same honours were, for the future, rendered them, as if they had been emperors of China. The same example was followed by subsequent kings, and now obtains among the grandes and literati; all now worship their ancestors, according to the rank which they themselves hold in the world. If the son be a mandarin,

sin, and the father only a doctor, the latter is buried as a doctor, but sacrificed to as a mandarin. The like holds in degradations, where the condition of the fathers is that of their sons.

* **ANCESTREL**. *adj.* [from *ancestor*.] Claimed from ancestors; relating to ancestors: a term of law.—Limitation in actions *ancestral*, was anciently so here in England. *Hale*.

* **ANCESTRY**, *n. s.* [from *ancestor*.] 1. Lineage; a series of ancestors, or progenitors; the persons who compose the lineage.

Phedon I hight, quoth he; and to advance
Mine *ancestry* from famous Coradin,

Who first to raise our house to honour did begin. *Spenser*.

A tenacious adherence to the rights and liberties transmitted from a wise and virtuous *ancestry*, public spirit, and a love of one's country, are the support and ornaments of government. *Addison*.

Say from what scepter'd *ancestry* ye claim,

Recorded eminent in deathless fame?

2. The honour of descent; birth.—Title and *ancestry* render a good man more illustrious, but an ill one more contemptible. *Addison*.

* **ANCHENTRY**. *n. s.* [from *ancient*, and therefore properly to be written *ancientry*.] Antiquity of a family; ancient dignity; appearance or proof of antiquity.—Wooing, wedding, and repenting, is a Scotch jig, a measure and a cinque pace; the 1st suit is hot and hasty, like a Scotch jig, and full as fantastical; the wedding mannerly modest, as a measure full of state and *anchentry*; and then comes repentance, and with his bad legs falls into the cinque pace faster and faster, till he sinks into his grave. *Shakespeare*.

ANCHILOPS, [*αγκυλον*, contraction, and *ψ*, eye;] in medicine, denotes an abscess, or collection of matter, between the great angle of the eye and the nose. If suffered to remain too long, or unskilfully managed, it degenerates, the stagnating humours corrupt, and an ulcer is produced.—When the tumor is broke, and the tears flow involuntarily, whilst the os lacrymale is not carious, it is an *aglyops*; but when the ulcer is of a long standing, deep, fetid, and the os lacrymale becomes carious, it is a *fistula*. The cure is by restriction and excision, tying it at the root on the glandula lacrymalis, and when ready, cutting it off. See **SURGERY**, **INDEX**.

ANCHIROMACHUS, in middle age writers, denotes a kind of vessel, which, on account of its nimble sailing, was used for the conveyance of anchors, and other necessary utensils of ships. It is also witten *ancyromagus*, *angromagus*, *anquiromagus*, and *anguromagus*.

ANCHISES, in fabulous history, a Trojan prince, the son of Capys, and descended from Dardanus. Venus made love to him in the form of a beautiful nymph; and bore to him Æneas, the hero of Virgil's *Æneid*.

(1.) * **ANCHOR**, *n. s.* [*anchora*, Lat.] 1. A heavy iron, composed of a long shank, having a ring at one end to which the cable is fastened, and at the other, branching out into two arms or flocks, tending upwards, with barbs or edges on each side. Its use is to hold the ship, by being fixed to the ground.

He said, and wept; then spread his sails
fore

The winds, and reach'd at length the Cum
Their *anchors* dropt, his crew the vessels mo

Dryden

2. It is used, by a metaphor, for any thing which confers stability or security.—which hope we have as an *anchor* of the soul, both sure and stedfast, and which entereth into that within the veil. *Psalm*.

3. The forms of speech in which it is most, commonly used, are, to *cast anchor*, to *lye* or *ride anchor*.—The Turkish general, perceiving that the Rhodians would not be drawn forth to battle at sea, withdrew his fleet, when *casting anchor*, and landing his men, he burnt the corn. *Knolton's History of the Turks*.

Entering with the tide,

He drop'd his *anchors*, and his oars he ply'd
Furl'd every sail, and drawing down the main
His vessel moor'd, and made with haulsers fast.

Dryden

Far from your capital my ship resides

At Reithrus, and secure at *anchor* rides. *Pope*

(2.) * **ANCHOR**. *n. s.* *Shakespeare* seems to have used this word for *anchoret*, or an abstemious close person.

To desperation turn my trust and hope!

An *anchor's* cheer in prison be my scope.

Shakespeare

(3.) **ANCHORS**, **ANCIENT**, **ACCOUNTS** OF. The most ancient anchors are said to have been of stone; and sometimes of wood, to which a great quantity of lead was usually fixed. In some places baskets full of stones, and sacks filled with sand, were employed for the same use. All these were let down by cords into the sea, and by their weight stayed the course of the ship. Afterwards they were composed of iron, and furnished with teeth which, being fastened to the bottom of the vessel, preserved the vessel immovable; whence *αγκυρες* and *αγκυρες* are frequently taken for anchors in Greek and Latin poets. At first there was only one tooth, whence anchors were called *αγκυρα*, but in a short time the second was added by Eupalamus, or Anacharsis, the Scythian philosopher. The anchors with two teeth were called *αμφαλοι*, or *αμφωτοι*; and from ancient monuments appear to have been much the same with those used in our days, only the transverse piece of wood upon their handles (the stock) is wanting in all of them. Every ship had several anchors, one of which, surpassing all the rest in bigness and strength, was peculiarly termed *αγα* or *σάκρα*, and was never used but in extreme danger; whence *σάκρην αγκοραν σολυειν*, is proverbially applied to such as are forced to their last refuge.

(4.) **ANCHORS**, **DESCRIPTION** OF MODELS. The anchors now made are contrived so as to sink into the ground as soon as they reach it, and to hold a great strain before they can be loosened or dislodged from their station. They are composed of a shank, a stock, a ring, and two arms with their flocks. The stock which is a long piece of timber fixed across the shank, serves to guide the flocks in a direction perpendicular to the surface of the ground; so that one of the flocks sinks into it by its own weight as soon as it falls, and is still preserved steadily in that position.

the *flank*, which, together with the *shank*, lies flat on the bottom. In this situation it must necessarily sustain a great effort before it can be drawn through the earth horizontally. Indeed it can only be effected by the violence of the water tide, or both of them, sometimes increased by the turbulence of the sea, and acting upon the *hook* as to stretch the cable to its utmost tension, and accordingly may dislodge the anchor from the bottom, especially if the ground be soft and oozy, or *muddy*. When the anchor is thus displaced, it is said to be *lost*, or *come home*. That the use of this useful instrument may be more fully understood, a representation of it is given Plate V. N° 1. It consists of a long massy beam directed perpendicularly, *b*, at the lower end of which are two arms, *d e*, of equal thickness with the beam (usually called the *shank*), only tapering upwards towards the points, which are elevated above the horizontal plane at an angle of 30 degrees, or inclined at the shank at an angle of 60 degrees; on the upper part of each arm (in this position) is a *flood* or thick plate of iron, *g h*, commonly shaped like an isosceles triangle, whose base is directed towards the middle of the arm. On the upper end of the shank is fixed the *stock* transverse with the *floods*; the *stock* is a long beam divided, *f*, in two parts, strongly bolted and hoop'd together with iron rings. See also N° 2. Close to the *stock* is the ring *a*, to which the cable is attached, or *beat*: the ring is curiously covered with a number of pieces of short rope, which are twisted about it so as to form a very thick texture called the *puddening*, and used to prevent the cable from being fretted or chafed by the *stock*. Every ship has, or ought to have, 3 principal anchors, with a cable to each, viz. the *main anchor*, (which is the *ancora sa-
ncta*); the *best bower*, *second ancre*; and the *third bower*, *ancre d'affourche*, so called from its situation on the ship's bows. There are also smaller anchors, for removing a ship from a place in a harbour or river, where there may not be room or wind for sailing; these are the *stream anchor*, *ancre de toue*; the *kedge*, or *grappling*, *grapin*: this last, however, is only designed for boats.

ANCHORS, METHOD OF MAKING. The *hook* of the anchor is a point of great importance. Great care is therefore to be taken, that the metal it is made of be neither too soft nor too hard; the latter rendering it liable to break and the former to straiten. The *shank*, arms, and *floods*, are first forged separately; then the hole is made at one end of the shank for the rings, the *flood* being also previously forged, is put into the hole of the shank, and the two ends shut together. After which the arms are shut to the shank, one after the other, and the anchor is finished. Proof is made of anchors, by raising them to a great height, and then letting them fall upon a kind of iron block placed across for the purpose. To try whether the *floods* will turn over the bottom and take hold of the ground, they are raised on an even surface, with the end of the *floods*, and one of the ends of the cable resting on the surface; in case the anchor does not take hold, and the point of the *flood* rises upwards,

the anchor is good. In England, France, and Holland, anchors are made of forged iron; but in Spain they are sometimes made of copper, and likewise in several parts of the South Sea. Travellers tell us of people in the Indies who make use of wooden anchors in their navigation.—The inhabitants of the island of Ceylon, in lieu of anchors, use huge round stones; and, in other places, their anchors are a kind of machines of wood, loaden with stones. Sometimes bags of sand have been made use of, but these chiefly obtained in rocky places, where anchors would not take hold.

(6.) **ANCHORS, PROPORTIONS OF.** For the proportions of anchors, according to Manwaring, the shank should be thrice the length of one of the *floods*, and half the length of the beam. According to Aubin, the length of the anchor should be four tenths of the greatest breadth of the ship; so that the shank, *e. gr.* of an anchor in a vessel 30 feet wide, is to be 12 feet long. When the shank is, for instance, 8 feet long, the two arms are to be 7 feet long, measuring them according to their curvity. As to the degree of curvity given the arms, there is no rule for it; the workmen are there left to their own discretion. The latter writer observes, that the anchor of a large heavy vessel is smaller, in proportion, than that of a lesser and lighter one. The reason he gives is, that though the sea employs an equal force against a small vessel as against a great one, supposing the extent of wood upon which the water acts to be equal in both, yet the little vessel, by reason of its superior lightness, does not make so much resistance as the greater; the defect whereof must be supplied by the weight of the anchor. From these, and other hydrostatic principles, the following table has been formed; wherein is shown, by means of the ship's breadth within, how many feet the beam or shank ought to be long, giving it four tenths or two fifths of the ship's breadth within: by which proportion might be regulated the length of the other parts of the anchor. In this table is represented likewise the weight an anchor ought to be for a ship, from eight feet broad to 45, increasing by one foot's breadth; supposing that all anchors are similar, or that their weights are as the cubes of the lengths of the shanks.

Breadth of the Vessel.	Length of the Anchor.	Weight.
8	3½	33
9	3¾	47
10	4	64
11	4¼	84
12	4½	110
13	4¾	140
14	5	175
15	5¼	216
16	5½	264
17	5¾	314
18	6	373
19	6¼	439
20	6½	512
21	6¾	592
22	7	686

Breadth of the Vessel.	Feet.	Feet.	Pounds.
	23	9 $\frac{1}{2}$	778
	24	9 $\frac{1}{2}$	884
	25	10	1000
	26	10 $\frac{1}{2}$	1124
	27	10 $\frac{1}{2}$	1259
	28	11 $\frac{1}{2}$	1405
	29	11 $\frac{1}{2}$	1562
	30	12	1728
	31	12 $\frac{1}{2}$	1906
	32	12 $\frac{1}{2}$	2097
	33	13 $\frac{1}{2}$	2300
	34	13 $\frac{1}{2}$	2515
	35	14	2742
	36	14 $\frac{1}{2}$	2986
	37	14 $\frac{1}{2}$	3242
	38	15 $\frac{1}{2}$	3512
	39	15 $\frac{1}{2}$	3796
	40	16	4096
	41	16 $\frac{1}{2}$	4426
	42	16 $\frac{1}{2}$	4742
	43	17 $\frac{1}{2}$	5088
	44	17 $\frac{1}{2}$	5451
	45	18	5832

M. Bouguer, in his *Traité de Navire*, directs to take the length of the shank in inches, and to divide the cube of it by 1160 for the weight. The reason is obvious; because the quotient of the cube of 201 inches, which is the length of an anchor weighing 7000 lb. divided by the weight, is 1160; and therefore, by the rule of three, this will be a common divisor for the cube of any length, and a single operation will suffice. The same author gives the following dimensions of the several parts of an anchor. The two arms generally form the arch of a circle, whose centre is three eighths of the shank from the vertex, or point where it is fixed to the shank; and each arm is equal to the same length, or the radius; so that the two arms together make an arch of 120 degrees: the flukes are half the length of the arms, and their breadth two fifths of the said length. With respect to the thickness, the circumference at the throat, or vertex of the shank, is generally made about the fifth part of its length, and the small end two thirds of the throat; the small end of the arms of the flukes, three fourths of the circumference of the shank at the throat. These dimensions should be bigger, when the iron is of a bad quality, especially if cast iron is used instead of forged iron.

(7.) ANCHORS, VARIOUS KINDS OF. There are 3 kinds of anchors commonly used; the *kedger*, the *grapnel*, and the *stream anchor*. The distinctions of anchors are taken from their use, and the proportion they bear in the ship, where they are employed; for that which in one ship would be called but a *kedger*, or *kedge anchor*, in a lesser would be a *sheet anchor*. 1. The *kedge anchor* is the smallest, which, by reason of its lightness, is first to stop the ship in kedging a river. This is what the Dutch sailors call *werp anchor*, the French *ancre à tour*. It ought to weigh 450

pounds. The *grapnel* is an anchor for a small ship or boat. 2. The *stream anchor*, is a small anchor fastened to a stream cable, wherewith to ride in rivers, and gentle streams, and to stop tide with in fair weather. 3. The *sheet anchor* is the biggest and strongest, being that which the seamen call their last hope; never to be used but in great extremity. This is what the Romans called *anchora sacra*; the Dutch *plegt anker*, a *stop anker*; the French *maitresse ancre*, or *grande ancre*.

(8.) ANCHORS, in architecture, are a sort of carving, somewhat resembling anchors. They are commonly placed as part of the enrichment of the boultins of capitals of the Tuscan, Doric, and Ionic orders, and also of the boultins of the mouldings of the Doric, Ionic, and Corinthian cornices, anchors and eggs being carved alternately through the whole building.

(9.) ANCHORS, in heraldry, are emblems of hope, and are taken for such in a spiritual as well as a temporal sense.

ANCHOR, TO CLEAR THE, signifies the getting the cable off the flook. Generally also, when they let fall the anchor, they use this term, to see that the buoy-rope, nor any other ropes, hang about it.

ANCHOR, TO DRAG THE, is when the anchor gives way, or loses its hold in the ground by the force of the wind, or sea, and the vessel drifts from the place.

ANCHOR, TO DROP THE, OR CAST, imports the letting it down into the sea. In some cases it is necessary to drop two anchors opposite to each other, one of them to keep the ship firm against the tide, or flow, the other against the ebb.

ANCHOR, TO FISH THE, to draw up the flook upon the ship's side after it is catted. See the articles DAVIT and FISH.

ANCHOR, TO RIDE AT, in the sea language, signifies the state of a vessel moored and fixed by her anchors at some proper station. Where a great number of vessels are moored in the same place, care is to be taken by the pilots, or those who have the command, that each ship be at a certain distance from the rest, to prevent their running foul of each other; also that they be neither too near, nor too far from land. The proper space betwixt vessels is, from two to three cable length.

ANCHOR, TO SHOE THE, denotes putting boards on the flukes, in the form of flukes themselves, to make it broader than before, used when they are obliged to anchor in bad ground to prevent the ship from driving. In some cases they use to tallow the anchor, where the ground is soft. The advantage of this seems to be, that the tallow sinks deeper into the ooze, and thus the anchor finds harder ground at the bottom, and fix in.

ANCHOR, TO STEER THE SHIP TO HER, imports to steer the ship's head towards the place where the anchor lies when they are heaving the cable into the ship; that the cable may thereby enter the haufe with less resistance, and the ship advance towards the anchor with greater facility.

ANCHOR, TO WEIGH, imports the act of weighing, or recovering the anchor into the vessel.

ebbish, or out of an old wall, where they will live three or four years.

4. *ANCHUSA ORIENTALIS*, or eastern bugloss, is a native of the Levant; but hardy enough to bear the open air in Britain, if it has a dry sandy soil. It is a perennial plant, with long trailing branches which lie on the ground. The flowers are yellow, and about the size of the common bugloss, and there is a succession of these on the same plants great part of the year.

5. *ANCHUSA SEMPERVIRENS*, or ever-green borage, is a very hardy perennial plant, with weak trailing branches. It grows naturally in some parts of Britain and Spain. The flowers are blue, and come out between the leaves on the spike, like the last. They appear during a great part of the year.

6. *ANCHUSA TINCTORIA*, or true alkanet, grows naturally in the Levant, but is equally hardy with the officinalis, (§ 3.) The flowers grow in long spikes, coming out *imbricatim*, like the tiles of a house.

7. *ANCHUSA VIRGINIANA*, or puccoon, grows naturally in the woods of North America; and being an early plant, generally flowers before the new leaves come out on the trees; so that in some woods where it abounds, the ground seems entirely covered with its yellow flowers. It is a perennial plant, which seldom rises a foot high in good ground, but not above half that height where the soil is poor. The flowers grow in loose spikes upon smooth stalks.

8. *ANCHUSA UNDULATA*, or Portugal bugloss, is a biennial plant, which grows to the height of two feet, and sends out many lateral branches. The flowers are of a bright blue colour, and grow in an imbricated spike.

(9.) *ANCHUSA*, USES OF THE. The flowers of the officinalis have obtained the name of *cordial* flowers; to which they have no other title, than that they moderately cool and soften, without offending, the palate or stomach; and thus, in warm climates, or in hot diseases, may in some measure refresh the patient. The root of the tinctoria is likewise used, not as possessed of any medicinal virtue, but on account of its imparting an elegant red colour to oily substances; so is frequently directed as a colouring ingredient for ointments, plasters, &c. As the colour is confined to the cortical part, the small roots are to be preferred, as having proportionably more bark than the large ones. The alkanet root which grows in England is greatly inferior to what comes from abroad.

ANCHYLOBLEPHARON, or rather *ANCYLOBLEPHARON*, [from *αγκυλος*, bent, and *βλεφαρον*, the eye-lid,] a distemper of the eye-lids, wherein they sometimes cohere to each other, and sometimes to the globe of the eye itself. This is easily distinguishable from the slight glewing up of the eye-lids, occasioned by the small pox, or the like. This disorder is sometimes brought with an infant into the world; sometimes it comes upon adults, by a fleshy excrescence from the angles of the eyes; and sometimes it happens from accidents, as, blowing up of gun-powder, the small pox, &c. This is always dangerous, and difficult of cure, but most so, when the eye-lids grow

to the cornea, which scarce ever admits of a cure. They are to be divided by a blunt pointed pair of scissors, and it must then be tried, whether they adhere to the eye; and, if they do, they must be separated with great caution, with a blunt pointed scalpel; for there is, in this case, great danger of injuring the sight; after which, the eyes must be kept from touching one another, to prevent their re-uniting, by lint dipt in a proper liniment; and by injections.

ANCHYLOPS. See *ANCHILOPS*.

ANCHYLOSIS. See *ANCYLOSIS*.

ANCI, [in Greek, *γναμνις*, *anewsel*, *elbow*, from *γναμν*, a *anewsel*, and *αγκων*, an *elbow*,] an epithet used by Hippocrates, for those, who, the head of the *os humeri* slipping into the socket, have an arm shorter and smaller than it ought to be, and seemingly like the elbow of a weaver, whence they are called by some *mustelani*, which fully expresses the Greek word. The disorder that gives occasion for the name, happens either in the womb, where the *os humeri* suffers a luxation, from too much moisture; or in tenderness of years, by means of an abscess, deeply seated about the head of the *os humeri*.

(1.) * *ANCIENT*. *adj.* [*ancien*, Fr. *antique*, Lat.] 1. Old; that happened long since; of old time; not modern. *Ancient* and *old* are distinguished; *old* relates to the duration of the thing itself, as, an *old* coat, a coat much worn; *ancient*, to time in general, as, an *ancient* dress, a habit used in former times. But this is not always observed; for we mention *old customs*; and though *old* be sometimes opposed to *modern*, *ancient* is seldom opposed to *new*, but when *new* means *modern*.—*Ancient* tenure is that, where all the manours belonging to the crown, in St Edward's or William the Conqueror's days, were held. The number and names of which manours, as all others belonging to common persons, were caused to be written in a book, after a survey made of them, now remaining in the exchequer, and called Domesday Book; and such as by that book appeared to have belonged to the crown at that time, are called *ancient demesnes*. *Cowell*. 2. Old; that has been of long duration.—*Wisdom* the *ancient* is wisdom, and in length of days understanding. *Job* xii. 12. *Thales* affirms, that God comprehended all things, and that God was of all things the most *ancient*, because he never had any beginning. *Raleigh*.

Industry

Gave the tall *ancient* forest to his axe. *Thomson*.

3. Past: former.—

I see thy fury: if I longer stay,
We shall begin our *ancient* bickerings.

Shakespeare

(2.) *ANCIENT DEMESNE*, TENANTS IN. In addition to Dr Johnson's extract from Cowell, it is proper to mention, that the tenants in *ancient demesne*, are of two sorts: the one hold the lands frankly by charter; the other by copy of court-roll, or by the verge, at the will of the lord, according to the custom of the manor. The advantages of this tenure are, 1. That tenants holding by charter, cannot be rightfully impleaded out of their manor; and, when they are, they may abate the writ, by pleading the tenure.

Th

ENGLAND. In later times, it made a figure among the Hanse towns; being advantageously situated amidst excellent pasture lands, and fertile corn fields; and the river Pene affording good opportunities of fishing and exporting their produce.

* **ANCLE.** See **ANKLE.**

ANCLIFF, a small town in Lancashire, two miles from Wigan. It has a hot spring, called the Burning Well.

ANCOATES, a village in Lancashire, a mile from Manchester.

ANCOBER, a territory on the Gold Coast of Guinea, so named from the river which runs thro' it. See next article.

ANCOBER, or **RIO CORBE**, a river of Africa, in the Gold Coast of Guinea, the banks of which afford an agreeable shade in that warm climate. There is a populous village, on its western bank.

ANCOME, a fellow; a swelling that is hard and hot. *Bailey*

(1.) **ANCON**, in anatomy, the curvation or flexure of the arm, whereon we rest in leaning.—It is commonly called *olecranon*.

(2.) **ANCON**, in antiquity, was used by the Carthaginians, to denote a dark prison or dungeon. Suidas mentions one of this kind, in which Gelimer used to put all who displeased him; from which Belisarius delivered many merchants of the East, whom the tyrant intended to put to death.

(3.) **ANCON**, in architecture, is used to denote the corner or quoin of walls, cross-beams, or rafters. **ANCONES**, in the ancient architecture, denoted the two branches of a square, which meet in an angle resembling the letter L; as well as the brackets or shouldering pieces, called *consoles* and *corbells* by the moderns.

(4.) **ANCON**, in geography, applied to the angles or flexures of rivers; and sometimes to the tops of mountains.

ANCONA, a province of Italy, in the pope's territories in Italy. It lies between the gulph of Venice and mount Appenine, which bound it on the N. as do Abruzzo on the E. and the duchy of Spoleto, and that of Urbino, on the W. The air is indifferent; but the soil is fruitful, particularly in hemp and flax; and there is great plenty of wax and honey. It contains several large towns, particularly Fermo, Loretto, Recanati, Macerata, Jesi, Tolentino, Ascoli, Osimo, St Severino, Monte Alto, Camerino, and Ripatransone, which are all archiepiscopal or episcopal sees.

ANCONA, a sea-port of Italy, the capital of the district of that name, and the see of a bishop; situated 15 m. N. of Loretto, and 130 E. of Rome. It was formerly the finest port in all Italy, being built by the emperor Trajan, about the year 115; but was almost ruined, and its trade lost; though it has again revived through the patronage of Clement XII, who made it a free port, and built a mole, for the security of the harbour, upon the ruins of the ancient mole. This mole is above 1000 feet in length, 160 in breadth, and 60 in depth below the surface of the sea. Its harbour is the best in all the pope's dominions, and abounds with a peculiar species of shell fish, called *ballani*. The town lies round it on two hills; one of which is at the point of Cape St Syriaco, from whence there is a delightful prospect. On

the other stands the citadel, which commands the town and harbour. The streets are narrow and uneven; and the public and private buildings inferior to those of the other great towns in Italy. The cathedral is a low dark structure; and though the front is covered with fine marble, the architecture has neither beauty nor regularity. The churches of St Dominic, and the Franciscan have each an excellent picture of Titian. The exchange where the merchants meet, is a handsome square portico, in which is an equestrian statue of Trajan. At the 4 corners are 4 other statues. The triumphal arch of Trajan, which was built upon the mole, remains almost entire, with its inscription. It is reckoned one of the most beautiful monuments of ancient Roman grandeur existing. The end of the mole is fortified with 10 or 12 pieces of cannon. There are about 500 Jews in it, who reside in a particular quarter of the city, and have a synagogue. It is a great thoroughfare from the north of Italy to Loretto, which renders provisions very dear. The tide does not rise here above a foot, and near the Mediterranean it is scarce visible. Long. 15. 5. Lat. 43. 36. N.

ANCONÆUS MUSCULUS, in anatomy, the sixth muscle of the elbow, so called, as being situated behind the solid of the *ancon*, or elbow.

ANCONES. See **ANCON**, N^o. 3.

(1.) * **ANCONY**. *n. f.* [in the iron mill] a bloom wrought into the figure of a flat iron, about 3 feet long, with 3 square rough knobs, at each end. *Chambers.*

(2.) **ANCONY**, **WEIGHT AND MANUFACTURE OF.** About 3 quarters of a cwt. is melted from a sow of cast iron; then hammered at the forge into a mass of 2 feet long, and of a square shape, called a *bloom*; this is sent to the finery, where, after 2 or 3 heats, it is brought to the figure above-mentioned, (q. 1.) and called an *ancony*. The middle part beat out at the finery, is about 3 feet long, and of the shape and thickness the whole is to be; this is sent to the chafery, where the ends are wrought to the shape of the middle and the whole made into a bar. See **BAR**.

ANCORARUM URBS, *Ἀγκυρῶν Πόλις*, a city of the Nomos Aphroditopolites, towards the Red Sea; so called because there was in the neighbourhood a stone quarry, in which they hewed stone anchors, before iron anchors came to be used.

ANCOURT, Florent Carton, d', an eminent French actor and dramatic writer, born at Fontainebleau, in 1661. He studied in the Jesuits college at Paris, under father de la Rue; who, discovering in him a remarkable capacity for learning, was extremely desirous of engaging him in their order; but Ancourt's aversion to a religious life rendered all his efforts ineffectual. After he had gone through a course of philosophy, he applied himself to the civil law, and was admitted advocate at 17 years of age. But falling in love with an actress, he married her, and turned to the stage, where he soon greatly distinguished himself, not only as an actor, but as a dramatic author. His plays had such prodigious success, that most of the players grew rich from the profits of them. His merit procured him a favourable reception.

frænum will stretch by the child's sucking and crying. It was formerly, a common opinion of midwives, that none were born without this infirmity; and hence, one of the first things after a birth, was to cut the string of the infant's tongue. Fabricius ab Aquapendente complains severely of the officiousness of midwives, who, without ever examining the condition of the *frænum*, practise the operation promiscuously on all infants, from an opinion, that, without it, the child would never be able to speak. But according to this author, there is scarcely one child among 100,000, in whom this ligament needs any cutting at all. In some parts of Italy, the midwives preserve a long nail on their right thumb, fashioned like a knife, wherewith, as soon as the child is born, they cut the ligament. In other places, the operation is performed with the edge of a piece of money. The operation is painful to the infant, and is sometimes followed by inflammations, and even death itself.

ANCYLOGLOSSUS, one that is tongue-tied, or has an impediment in his speech, arising from a contraction of the *frænum* of the tongue. The Ancyloglossi, by nature, are late before they begin to speak, but soon speak properly, after they begin. See last article.

ANCYLOMELE, [*αγκυλωμελη*, from *αγκυλος*, crooked, and *μηλη*, a probe;] a surgeon's crooked probe, or probe with a hook.

ANCYLOSIS, [from *αγκυλος*, hardness, or contraction,] in surgery, implies a distortion or stiffness of the joints, caused by a settlement of the humours, or a distension of the nerves, and therefore remedies of a mollifying and relaxing nature are required.

ANCYRA, the capital of Galatia, near the river Halys, said to have been built by Midas, king of Phrygia, and named from an anchor found there. It was greatly improved by Augustus, deemed the second founder of it, as appears from the Marmor Ancyranum. It is now called Angura, or Angoura. Long. 33. E. Lat. 41. 20.

ANCYROIDES, *αγκυροειδης*, or *coracoides*, in anatomy, the process of the shoulder bone, in form of a beak.

ANCYROPOLITES, the inhabitants of the city of ANCORÆ.

ANCYSTRUM, in botany: A genus of the digynia order, belonging to the diandria class of plants; the essential characters of which are: The calyx is a single-leaved, four-toothed perianthium, four-awn'd, the awns terminated with cross barbs. The corolla is four-cleft; the stigma pencil'd.

(1.)* AND. *conjunction*. 1. The particle by which sentences or terms are joined, which it is not easy to explain by any synonymous.

Sure his honesty
Got him small gains, but shameless flattery
And filthy beverage, and unseemly thilt,
And borrow base, and some good lady's gift.

Spenser.

What shall I do to be for ever known,
And make the age to come my own? Cowley.
The Danes unconquer'd offspring march behind;
And Morini, the last of human kind. Dryden.
It shall ever be my study to make discoveries

of this nature in human life, and to settle the proper distinctions between the virtues and perfections of mankind, and those false colours and resemblances of them that shine alike in the eyes of the vulgar. Addison. 2. And sometimes it lies *though*, and seems a contraction of *and if*. It is the nature of extreme self-lovers, as they will set an house on fire, and it were but to roast the eggs. Bacon. 3. In *and if*, the *and* is redundant and is omitted by all later writers.

I pray thee, Launce, *an' if* thou seest not my boy,

Bid him make haste.

Shakesp. *Two Gent. of Verona*

(2.) AND. *adv.* To the above definitions and illustrations of this monosyllable, given by Dr Johnson, we cannot help adding, that the word is, or at least has been, often used as an adverb instead of *now*. Thus, in numberless instances that occur in our present translation of the Bible it is evidently not a *conjunction*, but an adverb: e. g. "And it came to pass,"—"And the Lord spake unto Moses," &c. Considering the accuracy, with which Dr Johnson generally distinguishes between adverbs and prepositions, as well as between active and neutral verbs, &c. it is surprising that this adverbial use of the word should have escaped him. It is proper to add, however, that this use of the word is nearly obsolete.

ANDA, pison; a tree of Brasil, the wood of which is spongy and light; the leaf longish, firm, and pointed; the flower large and yellow, and the fruit a grey nut, which encloses, under a double rind, two kernels of the taste of chestnut. The fruit is said to be purgative, and a little emetic: two or three of the kernels are a dose. They extract oil by expression from these kernels with which the natives anoint their limbs. The rinds of the fruit are esteemed proper to stop looseness; thrown into ponds, they kill the fish.

ANDABATÆ, [from *ανεβαται*, mounted,] in antiquity, a sort of gladiators, who, mounted on horseback or in chariots, fought hoodwinked, having a helmet that covered their eyes.

ANDAJA, a river of Spain in Old Castile, which runs into the Duero.

ANDALUSIA, the most western province of Spain, bounded on the N. by Estremadura, La Mancha, and the Sierra Morena mountains; on the E. by Granada and Murcia; on the S. by the straits of Gibraltar, and the Atlantic Ocean, and on the W. by Alentejo and Algarva in Portugal, from which it is separated by the river Guadiana. It is about 182 miles long, and 150 broad. The chief cities and towns are Seville the capital, Beza, Gibraltar, Cordova, Cadiz, Medina Sidonia, Jaen, Port St Mary, &c. It is the best, most fruitful, and the richest part of all Spain, and abounds in all kinds of fruits, wines, grain, silk, sugar, oil, cinnabar, metals, cattle, and horses. It has a good air, a serene sky, a fertile soil, and a great extent on the sea-coast fit for commerce.

ANDALUSIA, New, a division of the province of Terra Firma in S. America, whose boundaries cannot be well ascertained, as the Spaniards pretend a right to countries in which they have never established any settlements. According to the most reasonable limits, it extends in length 500 miles.

[illegible]

■ *maifc*, fignifies a move-
between *largo* and *allegro*.
So, fignifies, that though
turned flow, yet the time
exactly and the found of

of France, in the depart-
ments, famous for its beau-
tiful mouth of the Eder, 10 m. from
W. Lat. 43. 25 N
Shropshire, that rises to the

Cavi, of Andes, a peo-
aving the Turones to the
e W the Pikones to the
domant to the N. It is

2 ANDREA, DM.
town of Gallia Celtica, now
called ANGERS. Long. 10.

ANDRAGON, in authors of no part of the formula of his lens we meet with *de-*
fectum, numbers of *quad-*

Some will have the *terru* it we call an *andiron*; odd, which it is known was getting into possession of France, in the department of the Seine, in the neighbourhood of Paris. Large woods of Peetre and Lys river to Paris.

of France, in the depart-
into a parts, by a paved
sustain to which pilgrims
all parts, to be cured of
feast day of the saint to
But the days of supersti-

tion are over in France. It is 20 miles S. E. of Rouen, and 40. N. W. of Paris. Long. 1. 30. E. Lat. 40. 20. N.

ANDENA, in old writers, denotes the first made in mowing of hay, or as much ground as a man could finish over at once.

ANDENAS, islands of Norway, in the government of Drontheim.

ANDREAS CASTLE, a small town in Cornwall, near St Columb.

ANDENØEN, an island of Norway, in Dron-
theim.

ANDEOL, *Sr.*, a town of France in the department of Ardèche, 5 miles S. of St Vivien. Long 2. 10. E. Lat. 44. 24. N.

ANDER. See ANDERU.
ANDERAR, the most southern city of the rep.

ANDERAB, the most southern city to the province of Baluch, possessed by the Usbeck Tartars. It is very rich and populous, but a place of no great strength. The neighbouring mountains yield excellent quantities of lapis lazuli, in which the Bakhars drive a great trade with Persia and India. This city is situated at the foot of the mountains dividing the dominions of the Great Mogul and Persia from Great Buthiana. As there is no other way of crossing these mountains but by the road through this city, all travellers with goods must pay 4 per cent. On this account the Khan of Baluch maintains a good number of soldiers in the place.

ANDERBY, a small town of Lincolnshire, near Ailford.

ANDREY-AMIRAS, a small town in the N. Riding of Yorkshire, near Bedal.

ANDERBY-STEEPLE, a village of Yorkshire
near Richmond.

ANDERBY WHEATHOW, a village of Yorkshire near Northampton.

ANDERK NÆ sat, in natural history, a name given by many of the old writers, to the patrum

given by nature to the said minerals, to be metals or nitre or the minerals. Some have, since these times, applied it to our common nitre, and it has been wondered at, that the accounts do not agree with the substance. But it is to be observed, that the nature of the minerals is a fixed salt, approaching to the nature of pot-ash, and not at all inflammable with sulphur, as our nitre is. It is, therefore, no wonder if the things related of the one should not be found to agree with the other.

ANDERLECHT, a fortress of Brabant, in one of the new departments of France, two miles N of Brussels.

ANDERNACHT, a city of Cologne, in the circle of the Lower Rhine. It is situated in a plain on the Rhine; and is fortified with a wall, castle, and bastworks. It has a trade in stone jugs and plecters, which are sent to the mineral waters at Dunchstein. There are 3 monasteries here, and several churches. Long. 7. 52. E. Lat. 50. 29. N.

ANDERNESSE, *Andennesses*, Sax. from *an* an oak, *mesa*, a mound, and *ness*, a promontory. a town in Lancashire, (surrounded with oaks

ANDEKO, Sr., a sea port town in the bay of Bikay, in Old Cádiz, seated on a small peninsula. It is a trading town, and contains about 700 houses, a parish church, and a monastery. Here the Spaniards build and lay up some of their men of war. Long. 4. 30. W Lat. 43. 20. N.

ANDERSON, Adam, was for 40 years a clerk in the South Sea House; and at length arrived to his acmè there, being appointed chief clerk of the Stock and New Annuities, which he retained till his death. He was appointed one of the trustees forestablishing the colony of Georgia in America; and was also one of the court of assistants of the Scots corporation in London. He published his *Historical and Chronological Deduction of Trade and Commerce*, a work replete with useful information, about the year 1762. He was twice married; and died at London in 1775. He had a good library of books, which were sold by his widow, who died in 1781.

ANDERSON, James, D. D. editor of the *Diplomata Scotiæ* and *Royal Genealogies*, was many years minister of the Scots episcopalian church in Swallow Street, Piccadilly, and well known in those days among the people of that persuasion resident in London by the name of *Bishop Anderson*. He was a learned but imprudent man, and lost a considerable part of his property in the fatal year 1726. His royal genealogies were printed in large folio. It is a most comprehensive work and includes almost every person of any eminence, mentioned either in real or fabulous history, from Adam to his own time. It would be improper to conclude this brief account of our *Royal Genealogist*, without mentioning that he married, and had issue a son, and a daughter who was the wife of an officer in the army. He was brother to Adam Anderson above-mentioned.

ANDERSON, Sir Edmund, a younger son of an ancient Scotch family settled in Lincolnshire. He studied at Lincoln College, Oxford; and removed thence to the Inner Temple, where he applied to the law, and became a barrister. In the 9th of queen Elizabeth he was both lent and summer reader, and in the 16th double reader. He was appointed the queen's serjeant at law in the 19th year of her reign; and some time after, one of the justices of assize. In 1582 he was made lord chief justice of the common pleas, and in the year following was knighted. He held his office to the end of his life, died in 1605, and was buried at Eyworth in Bedfordshire. He was an able lawyer; but a scourge to the Puritans; and a strenuous supporter of the established church. His works are, 1. Reports of many principal cases argued and adjudged in the time of queen Elizabeth, in the common bench. Lond. 1644, fol. 2. Resolutions and judgments on the cases and matters agitated in all the courts of Westminster, in the latter end of the reign of queen Elizabeth. Published by John Goldsborough, Esq. Lond. 1653, 4to. Besides these, there is a manuscript copy of his Readings still in being.

ANDERSTON, a populous village within a mile of Glasgow, of which it is one of the suburbs. According to Sir John Sinclair's Statistical Account of that city, Anderston contained 3895 inhabitants, in 1791. For farther particulars, see GLASGOW.

ANDERSTON, a village in Dorsetshire, near Bere.

ANDERTON, two villages in England: viz. 1. in Cheshire, near Bucklow; and 2. in Lancashire, between Eccleston and Wigan.

ANDERTON FORD, a village of Lancashire near Ormskirk.

(1.) **ANDES**, a great chain of mountains in South America, which, running from the northern part of Peru, to the Straits of Magellan, between 3000 and 4000 miles, are the longest and most remarkable in the world. The Spaniards call them the *Cordillera de los Andes*; they form two ridges, the lowermost of which is overgrown with woods and groves, and the uppermost covered with everlasting snow. Those who have been at the top, affirm, that the sky is always serene and bright; the air cold and piercing; yet so thin, that they were scarce able to breathe, and the respiration was much quicker than ordinary; and this is attended with retching and vomiting; which, however, has been considered by some, as merely accidental. When they look downwards, the country was hid by the clouds that hovered on the mountain's sides. The mountains just mentioned, which have been frequently ascended, are much inferior in height to many others in this enormous chain.

(2.) **ANDES**, ACCOUNT OF A PHILOSOPHICAL EXPEDITION UPON THE. The following is an account given of the mountain called Pichincha by the mathematicians, sent by the kings of France and Spain, to make observations, in relation to the figure of the earth. Soon after, the artists arrived at Quito, they determined to continue the series of the triangles for measuring the arch of the meridian to the S. of that city: a company accordingly divided themselves into two bodies, consisting of French and Spaniards, each retired to the part assigned them. I. George Juan, and M. Godin, who were at the head of one party, went to the mountain Pambamarca; while M. Bougeur, de la Condamine, and Don Ulloa, together with their assistants, climbed up to the highest summit of Pichincha. Both parties suffered extremely, as from the severity of the cold, as from the impetuosity of the winds, which, on these heights blow with incessant violence; difficulties therefore very painful, as they had been little used to such exertions. Thus, in the torrid zone, nearly under the equinoctial, where it is natural to suppose they had most to fear from the heat, their greatest pain was caused, by the excessiveness of the cold. Their first scheme, for shelter and lodging in these uncomfortable regions, was, to pitch a field tent for each company; but on Pichincha this could not be done, from the narrowness of the summit: they were therefore obliged to be contented with a hut, so small, that they could hardly all creep into it. Nor will this appear strange, if the reader considers the bad disposition and smallness of the place, it being one of the loftiest crags of a rocky mountain, 100 fathoms above the highest part of the desert of Pichincha. Such was the situation of their mansion, which like all the other adjacent parts, soon became covered with ice and snow. The ascent up this stupendous rock, from the base, or the place where the mules could come, to their habitation was so craggy, as only to be climbed on foot, and to perform it, cost them four hours continual labour and pain, from the violent efforts of

ANDRADA, a learned Portuguese, born at Conimbria, who distinguished himself at the council of Trent, where king Sebastian sent him as one of his divines. There is scarce any Catholic author who has been more quoted by the Protestants than he, because he maintained some liberal opinions concerning the salvation of the Heathens. Andrada was esteemed an excellent preacher. His sermons were published in three parts, the second of which was translated into Spanish by Benedict de Alcoran. Olorius, in his preface to the "Orthodox Explanations of Andradas," gives him the character of a man of wit, vast application, great knowledge in the languages, with all the zeal and eloquence necessary to a good preacher; and Rosweidus says, that he brought to the council of Trent, the understanding of a most profound divine, and the eloquence of a consummate orator.

ANDRAGHIRA, a river of Sumatra, upon which the Dutch have a factory.

ANDRAIG, a sea port of Majorca, with a fort.

ANDRAPODISMUS, in ancient writers, the selling of persons for slaves.

ANDRAPODISTES, [*ανδραποδιστες*,] a dealer in slaves, more particularly a kidnapper, who steals men or children, to sell them; a crime the Thesalians were noted for.

ANDRAPODOCAPELI, in antiquity, a kind of dealers in slaves. The *andrapodocapeli* had a particular process of taking off moles, and the like disfigurements on the faces of the slaves they kept for sale, by rubbing them with bran. At Athens several places in the forum were appointed for the sale of slaves. Upon the first day of every month, the merchants brought them into the market, and exposed them to sale, whilst the crier, standing upon a stone erected for that purpose, called the people together.

ANDRARUM, a town of Sweden, in S. Gothland, near 3 miles S. of Christianstadt, where there is the greatest alum work in the kingdom.

ANDRE, Major J. an adjutant-general in the British army, who fell a sacrifice to his zeal for his country, during the American war. Being employed to negotiate the defection of Arnold and his troops, he was apprehended in disguise on the 23d Sept. 1780, by three Americans, to whom he offered his watch and money to let him escape, but in vain. Being sent prisoner to General Washington, that general submitted his case to the examination and decision of a board of general officers, consisting of Major-generals Green, Lord Stirling, the Marquis de la Fayette, the Baron de Stenben, two other major-generals, and 8 brigadier-generals. Major Andre was examined before them, and the particulars of his conduct inquired into; and they reported to the American commander in chief, that Mr Andre came on shore from the Vulture sloop of war in the night, on an interview with General Arnold, in a private and secret manner; that he changed his dress within the American lines; and, under a feigned name, and in a disguised habit, passed the American works at Stony and Verplank's points, on the evening of the 22d of September; that he was taken on the morning of the 23d at Tarry-town,

he being then on his way for New York; that, when taken, he had in his possession several papers which contained intelligence for the army. They therefore determined, that he ought to be considered as a spy from the enemy; that, agreeable to the law and usage of nations, he ought to suffer death. Sir Henry Clinton, Lieutenant-general Robertson, and the late American general Arnold, all wrote pressing letters to General Washington on the occasion, in order to prevent the decision of the board of general officers from being put in force: But their applications were ineffectual. Major Andre was hanged at Tappan, in the province of New York, on the 2d of October. He met his fate with great firmness; but appeared somewhat hurt that he was not allowed a more military death, for which he had solicited. He was a gentleman of very valuable qualities, had a taste for literature and fine arts, and possessed many accomplishments. His death, therefore, was regretted even by his enemies; and the severity of the determination concerning him was much exclaimed against in Great Britain. It was, however, generally acknowledged by the impartial, that there was nothing in the execution of this unfortunate gentleman but what was perfectly consonant to the rules of war. An elegant monument is erected to his memory in Westminster Abbey.

ANDRE, ST, the name of several different places, viz. 1. a district in Corsica; 2. and 3. two towns in France in the department of Mont Blanc: 4. another in the ci-devant province of Languedoc; 5. another in the department of Rhone and Loire; and, 6. a village in Northumberland, 6 miles from Hexham. See also next article.

ANDRE, ST, DE BEAULIEU, a town of France in the department of Indre and Loire.

ANDREA, ST, a small village on the Malabar coast in the East Indies, founded originally by the Portuguese. It takes its name from a church dedicated to St Andrew, and served by the priests of St Thomas.—On the shore of St Andrea, about half a league out in the sea, lies Mud Point, a place which few in the world can parallel. It is open to the wide ocean, and has neither island nor bank to break the force of the billows, which come rolling with great violence from all parts during the S. W. Monsoons; but on this bank, mud they lose their force in a moment; and ships lie on it as secure as in the best harbour, without motion or disturbance. It reaches about a mile along shore, and has been reported to shift its place from the northward about 3 miles in 10 years. From St Andrea to Kranganôr, about 10 leagues to the south, the water has the bad property of causing swellings in the legs of those who drink it constantly. Some it affects in one leg and some in both. It causes no pain, but it is very inconvenient; nor does the swelled leg seem heavier to the owner than the small one, though some have been seen a yard in circumference at the ankle. The Romish legends impute the cause of this distemper (for which no preventative or cure hath been hitherto found) to a curse laid by St Thomas upon his murderers and their posterity; though, according to the Romans themselves, St Thomas was killed by the Tilinga priests at Meliaphur.

wrote also moral and proverbial letters in prose, which were printed several times. His poems, which are chiefly in Latin, are inserted in Vol. I. of the *Deliciæ Poetarum Italarum*. Mr De la Monnoie tells us, "that Andrelinus, when he was but 22 years old, received the crown of laurel: That his love verses, divided into four books, intitled *Livia*, from the name of his mistress, were esteemed so fine by the Roman Academy, that they adjudged the prize of the Latin elegy to the author." He died in 1518.—This author's manner of life was not very exemplary; yet he was so fortunate, says Erasmus, that though he took the liberty of rallying the divines, he was never brought into trouble about it.

ANDRESWALD, [from *andred*, fear, and *avald*, a wood, Sax. i. e. a terrible wood,] an extensive wood of 12 miles in length, lying partly in Suffex, and partly in Kent.

ANDRETIVM. See **ANDETIVM**.

ANDREW, ST, the apostle, born at Bethsaida in Galilee, brother to Simeon Peter. He had been a disciple of John the baptist, and followed Jesus upon the testimony given of him by the baptist. His history, so far as is recorded in the gospels, we need not here repeat. After our Saviour's ascension, his apostles having determined by lot what parts of the world they should severally take, Scythia and the neighbouring countries fell to St Andrew, who according to Eusebius, after he had planted the gospel in several places, came to Patræ in Achaia, where, endeavouring to convert the proconsul Ægeas, he was by that governor's orders scourged, and then crucified. The particular time of his suffering martyrdom is not known; but all the ancients and modern martyrologies, both of the Greeks and Latins, agree in celebrating his festival upon the 30th of November. His body was embalmed, and decently interred at Patræ by Maximilla, a lady of great quality and estate. Afterwards it was removed to Constantinople by Constantine the Great, and buried in the great church, which he had built to the honour of the apostles. There is a cross to be seen at this day in the church of St Victor at Marseilles, which is believed by the Romanists to be the same that St Andrew was fastened to. It is in the shape of letter X, and is inclosed in a silver shrine. Peter Chrysologus says, that he was crucified upon a tree; and the spurious Hippolytus assures us it was an olive tree.

ANDREW, ST, a town of Germany, in the circle of Austria and duchy of Carinthia, with a bishop's see; seated on the Levant.

ANDREW, ST, KNIGHTS OF, an order of knights, more usually called the order of the thistle. (See **THISTLE**.) The knights of St Andrew, are also an order instituted by Peter the Great of Muscovy in 1698; the badge of which is a golden medal; on one side whereof is represented St Andrew's cross, with these words, *Cazar Pierre monarque de tout la Russie*. This medal, being fastened to a blue ribbon, is suspended from the right shoulder.

ANDREW'S CASTLE, ST, a village in Hampshire, between Southampton and Petersfield.

ANDREW'S CROSS, ST, one in form of the letter X. See **CROSS**.

ANDREW'S DAY, ST, a festival of the Christian church, celebrated on the 30th of November, in honour of the apostle St Andrew.

ANDREWS, Lancelot, bishop of Winchester, was born at London in 1555, and educated at Cambridge. After several preferments, he was made bishop, first of Chichester, then of Ely, and, in 1618, was raised to the see of Winchester. This learned prelate, who was distinguished by his piety, charity, and integrity, may be justly ranked with the best preachers and completest scholars of his age. He appeared to much greater advantage in the pulpit than he does now in his works, which abound with Latin quotations and trivial witticisms; suited to the taste of the times in which he lived. He was a man of polite manners and lively conversation; and could quote Greek and Latin authors, and even pun, with king James. When Waller the poet, was young, he had the curiosity to go to court, and stood in the circle to see king James dine; where, among other company, there sat at table two bishops, Neale and Andrews. The king asked aloud, "Whether he might not take his subjects' money when he needed it, without all this formality of parliament?" Neale replied, "God forbid you should not; for you are the breath of our nostrils." Whereupon the king said to the bishop of Winchester, "Well, my lord, what say you?" "Sir (replied the bishop,) I have no skill of parliamentary cases." The king answered, "No put-offs, my lord; answer me presently." "Then Sir, (said he,) I think it lawful for you to take my brother Neale's money, for he offers it." The company was pleased with his answer, but the wit of it seemed to affect the king; for a certain lord coming in soon after, he cried out, "O, my lord, they say you lig with my lady." "No, Sir, says his lordship, in confusion, but I like her company because she has so much wit." "Why then says the king, do not you lig with my lord of Winchester there?"—This great prelate died at Winchester-house in 1626, aged 71, and was buried in the church of St Saviour's, where his executors erected to him a monument of marble and alabaster on which is an elegant inscription in Latin. Milton also, at 17 years of age, wrote a beautiful Latin elegy on his death. Bishop Andrews had, 1. A share in the translation of the Bible, from Genesis to 2 Kings, inclusively. He also wrote, 2. *Tortura Torti*, in answer to a work of cardinal Bellarmine, in which that prelate assumed the name of Matthew Tortus. 3. A Manual of Private Devotions: and, 4. A Manual of Directions for the Visitation of the Sick: besides Sermons and Tracts, in English and Latin, published after his death.

(1.) **ANDREWS**, ST, a royal borough of Fife shire in Scotland, formerly the metropolis of the Pictish kingdom. It is seated on a bay, on the level top of a small hill, 32 miles from Edinburgh, commanding a view of the German ocean. Long. 2. 45. W. Lat. 56. 18. N. See the following sections.

(2.) **ANDREWS ST**, ANCIENT ACCOUNTS OF

formerly prohibited, as useless and unprofitable to the public; and archery recommended as preferable.

(4.) **ANDREW'S, ST, CASTLE OF.** The remains of the castle, are still to be seen on the E. side of the city, on a rock overlooking the sea. This fortress was founded, in 1401, by Bishop Trail, who was buried in the high altar of the cathedral; and was afterwards the residence of cardinal Beaton; who, after the death of George Wishart, apprehending some danger, caused it to be fortified so strongly as to be at that time deemed impregnable. In this fortress, however, he was surprized and assassinated by Norman Lesly with 15 others. They seized on the gate of the castle early in the morning of May 29, 1546; it having been left open for the workmen who were finishing the fortifications; and having placed centinels at the door of the cardinal's apartment, they awakened his numerous domestics one by one; and, turning them out of the castle, they without violence, tumult, or offering the smallest injury to any other person, inflicted on Beaton the death he justly merited. The conspirators were immediately besieged in this castle by the regent, earl of Arran; and notwithstanding they had acquired no greater strength than 150 men, they resisted all his efforts for five months. This, however, was owing to the unskilfulness of the besiegers more than to the strength of the place; for, in 1547, the castle was reduced and demolished. The entrance of it is still to be seen; and the window is shown, out of which it is said the cardinal looked, to glut his eyes with the cruel martyrdom of George Wishart, who was burnt on a spot beneath.

(5.) **ANDREW'S, ST, EXTENT AND POPULATION OF.** St Andrew's is a mile in circuit, and contains three principal streets. On entering the west port, a well built street, straight, and of a vast length and breadth, appears; but so overgrown with grass, and presenting such a dreary solitude, that it conveys the idea of being laid waste by the pestilence. St Andrew's is now greatly reduced in the number of its inhabitants; at present scarcely exceeding 2000. It is impossible to ascertain the number when it was the seat of the primate: all that can be known is, that during the period of its splendor, there were between 60 and 70 bakers; but now 9 or 10 are sufficient for the place.

(6.) **ANDREW'S, ST, TRADE, HARBOUR, &c. OF.** The trade of St Andrew's was once very considerable. So late as the reign of Charles I. this place had 30 or 40 trading vessels, and carried on a considerable herring and white fishery, by means of buffes, in deep water; which fisheries had for ages been the grand source of their commerce, wealth, and splendor. After the death of the king, this whole coast, and St Andrew's in particular, became a scene of murder, plunder, and rapine: every town suffered in proportion to its magnitude and opulence. Nor were those ruffians satisfied with the shipping, merchandise, plate, cattle, &c. for they also laid the whole coast under contribution. St Andrew's was required to pay 1000l. but the inhabitants not being able to raise that sum after being thus plundered, the general compounded for 500l. which

was raised by a loan at interest, and hath remained a burden upon the corporation, it is said, ever since. The harbour is artificial, guarded by pier with a narrow entrance, to give shelter to vessels from the violence of a very heavy sea, by the encroachments of which it has suffered much. The manufactures this city might in former times possess, are now reduced to one, that of golf-balls, which, trifling as it may seem, maintains a great number of people. St Andrew's, however, has 5 annual fairs, viz. on the 2d Thurs. in April, Tuesd. in July, 1st Aug. 29th Sept. and on *Andrew's day*, all O. S. and a weekly market on Thursday.

(7.) **ANDREW'S, ST, UNIVERSITY OF.** The celebrated university of this city was founded 1411, by bishop Wardlaw; and the next year obtained from Benedict III. the bull of confirmation. It consisted once of 3 colleges. 1. St Saviour's, founded in 1458, by bishop Kennedy. This is a handsome building, with a court quadrangle within: on one side is the church, on another the library; the third contains apartments for students; the fourth is unfinished. St Leonard's College was founded by prior Hurn, in 1522. This is now united with the library and the buildings sold, and converted into private houses. 3. The new, or St Mary's college, was established by abp. Hamilton in 1553; but the house was built by James and David Bethune. Beaton, who did not live to complete it. It is said to have been the site of a *schola illustris* long before the establishment even of the university, where several eminent clergymen taught, gave the sciences and languages. But it was called a *new college*, because of its late erection into a university college by the abp. The university is governed by a chancellor, an office originally designed to be perpetually vested in the abps. of St Andrew's; but since the reformation, he is elected by the 2 principals, and the professors of both the colleges. The rector is the next great officer to whose care is committed the privileges, discipline, and statutes of the university. The colleges have their rectors, and professors of different sciences, who are indefatigable in their attention to the instruction of the students, and to that essential article their morals. This place possesses several very great advantages respecting the education of youth. The air is pure and salubrious; the place for exercise, dry and extensive; the exercises themselves are healthy and innocent. The university is fixed in a peninsulated country; remote from all commerce with the world, which in great towns prove the haunt of dissipation. From the smallness of the society every student's character is perfectly known. No little irregularity can be committed, but it is instantly discovered and checked; vice cannot attain a height at this place, for the incorrigible are never permitted to remain the corrupters of the rest. A printing office was established here for the convenience of the university, in 1795; and very correct and elegant editions of several classics have been printed under the care of Mr John Hunter.

ANDREW'S, ST, is also the name of several other places; viz. 1 and 2, an island and town in Dalmatia: 3 and 4, an island and town in Hungary.

that account require a divorce. It is only the licentious abuse either of one or the other sex which can be subjected to the animadversion of the police. See HERMAPHRODITE. Such are the sentiments of the authors of the French Encyclopédie. To these it has been objected, that "from such heterogeneous matches nature seems to recoil with innate and inextinguishable horror; and that none of these invincible aversions are implanted in our frame, without a final cause worthy of its Author." Hence they infer, that "the law should interfere, as nature revolts against such horrible conjunctions." In answer to this, it might be sufficient to observe, that there are many unaccountable and invincible aversions implanted in the frame of particular individuals, the purpose of which seems quite inexplicable; such as for instance, the aversion that some people of weak nerves feel at the sight of a cat; but where no such antipathy takes place, and more especially, if the androgyne is so perfect in one sex, as to be prolific, we cannot see either justice or humanity in proposing a divorce; or in calling in the aid of the police to punish as a *crime*, what is at worst only a *misfortune*. Instances of androgynes, we believe, occur very rarely; but, where they do occur, the mother of such an individual should instruct it, when it arrives at the period of puberty, to be candid with any lover who seriously proposes marriage, and inform such a person before hand, of the defect or redundancy under which it labours; and then, if the lover's affection is so strong as to get over this difficulty, there can be no cause for complaint afterwards; and the parties may live together as happily as other married people. An honest declaration of this kind is the only antidote that justice and humanity can prescribe, against the evils otherwise to be dreaded by an androgyne after marriage.

(3.) ANDROGYNES, in the mythology, creatures of whom, according to the fable, each individual possessed the powers and characters of both sexes having two heads, four arms, and two feet. The rabbinical writers pretend, that Adam was created double, one body being male, the other female; which in their origin not being essentially joined, God afterwards did nothing but separate them. Plato adopts the same idea in his *Banquet*, and says, the gods originally formed man with two bodies and two sexes; but that being also endowed with a gigantic force, man became insolent and made war against the gods. Jupiter, exasperated, debilitated this double being, by disjoining the male from the female, and leaving each half to subsist with its own powers alone.—This fable of Plato has been used with great ingenuity by a modern French poet, who attributes the propensity which attracts one of the sexes towards the other, to the natural ardour which each half of the *androgynes* feel for reunion; and their inconstancy, to the difficulty which each of the separated parts encounters, in its efforts to recover its proper and original half. If a woman appears to us amiable, we instantly imagine her to be that moiety with whom we should only have constituted one whole, had it not been for the fault of our original double-sexed progenitor.

* ANDROGYNOUS. *adj.* The same with *drogynal*.

ANDROGYNOUS, in botany. See ANDROGYNE.
ANDROGYNUM, in ecclesiastical writers, used to denote *matrimony*, or even one of the parties married.

ANDROGYNUM BALNEUM, denotes a bath common to both sexes.

(1.) * ANDROGYNUS. *n. s.* [See ANDROGYNE.] An hermaphrodite; one that is of both sexes.

(2.) ANDROGYNUS, in astrology, planets which are sometimes hot, and sometimes cold: the Mercury, when near the sun, is reputed hot and dry by astrologers; and when near the moon, cold and moist.

(1.) ANDROIDES, [from *andros*, a man, and *eidēs*, form,] in mechanics, a human figure, which by certain springs or other movements, is capable of performing some of the natural motions of a living man. The motions of the human body are more complicated, and consequently more difficult to be imitated, than those of any other creature; whence the construction of an *androides*, in such a manner as to imitate any of these actions with tolerable exactness, is justly supposed to indicate a greater skill in mechanics than any other piece of workmanship whatever. A very remarkable figure of this kind appeared in Paris, in the year 1738. It represented a flute player, and was capable of performing many different pieces of music on the German flute; which, considering the difficulty of blowing that instrument, the different contractions of the lips necessary to produce the distinctions between the high and low notes, and the complicated motions of the fingers, must appear truly wonderful. This machine was the invention of M. Vaucanson, member of the Royal Academy of Sciences; and a particular description of it was published in the *Memoirs of the Academy* for that year.

(2.) ANDROIDES, AN EXTRAORDINARY, DESCRIBED. The figure itself was about five feet and an half in height, situated at the end of an artificial rock, and placed upon a square pedestal four feet and an half high and three and an half broad. The air entered the body by three pipes separate one from another. It was conveyed to them by 9 pair of bellows, 3 of which were placed above and 6 below. These were made to expand and contract regularly in succession, by means of an axis of steel turned round by some clock-work. On this axis were different protuberances at proper distances, to which were fixed cords thrown over pulleys, and terminating in the upper boards of the bellows, so that, as the axis turned, the boards were alternately raised and let down. A contrivance was also used to prevent the disagreeable hissing fluttering noise usually attending the motion of bellows. This was by making the cord by which the bellows was moved, press, in its descent, upon one end of a smaller lever, the other end of which ascending forced opened the small leathern valve that admitted the air, and kept it so, till the cord being relaxed by the descent of the upper board, the lever fell, and the air was forced out. Thus the bellows performing the

finning the same number of motions. The automaton could not play unless Mr de Kempelen or his substitute was near it to direct its moves. A small square box, during the game, was frequently consulted by the exhibiter; and herein consisted the secret, which he said he could in a moment communicate. He who could beat Mr de Kempelen was, of course, certain of conquering the automaton. It was made in 1769. His own account of it was: "C'est une bagatelle qui n'est pas sans merite du cote du mecanisme, mais les effets n'en paroissent si merveilleux que par la hardiesse de l'idee, & par l'heureux chioz des moyens employs pour faire illusion." The strongest and best armed loadstone was allowed to be placed on the machine by any of the spectators. As the inventor of this admirable piece of mechanism hath not yet thought proper to communicate to the public the means by which it is actuated, it is in vain for any, except those who are exquisitely skilled in mechanics, to form conjectures concerning them.—Many other curious imitations of the human body, as well as that of other animals, have been exhibited, though none of them equal to the last mentioned one. See AUTOMATON.

ANDROLEPSY, in Grecian antiquity, an action allowed by the Athenians against such as protected persons guilty of murder. The relations of the deceased were empowered to seize 3 men in the city, or house whither the malefactor had fled, till he were either surrendered, or satisfaction made some way or other for the murder. The word is, therefore, used for reprisals.

ANDROMACHE, the wife of the valiant Hector, the mother of Astyanax, and daughter of Eetion king of Thebes in Cilicia. After the death of Hector and the destruction of Troy, she married Pyrrhus; who afterwards gave her to Helenus the son of Priam, with part of Epirus.

ANDROMACHI theriaca or *treacle* of **ANDROMACHUS**, in pharmacy, is a capital alexipharmic composition; called also Venice treacle.

(I.) **ANDROMEDA**, in astronomy, a northern constellation, behind Pegasus, Cassiopeia, and Perseus. It represents the figure of a woman chained. The stars in this constellation, in Ptolemy's catalogue, are 23, in Tycho's 22, in Bayer's 27, in Mr Flamsted's no less than 84.

(II.) **ANDROMEDA**, in botany, the **MARSH CYS-TRUS**: A genus of the monogynia order, belonging to the decandria class of plants; and in the natural method ranking under the 18th order, bicornes. The characters are: The calyx is a quinquepartite perianthium, small, coloured, and persistent: The corolla is monopetalous, campanulated, and quinquefid, with reflected divisions: The stamina consist of ten subulated filaments, shorter than the corolla; the anthers two horned and nodding: The pistillum has a roundish germen; a cylindric stylus larger than the stamina, and persistent: and an obtuse stigma: The pericarpium is a roundish five cornered capsule, with five cells and five valves: The seeds are very numerous, roundish, and glossy. There are 15 species of which the following are the principal.

ANDROMEDA ARBOREA is a native of Virginia and Carolina, where it is called the sorrel

tree. It grows to the height of 20 feet, with trunk usually 5 or 6 inches thick. The branches are slender, thick set with leaves, like those of the pear tree. From the ends of the branches proceed many slender stalks, on the one side which hang many small white flowers, like those of the strawberry plant. This species should be kept from frost in winter, and often watered in summer.

(2.) **ANDROMEDA CALYCVLATA**, is a native of Siberia, and likewise of North America. It grows on mossy land, and is therefore very difficult to keep in gardens. The leaves are shaped like those of the box tree, and are of the firm consistence, having several small punctures on them. The flowers grow in short spikes, from the extremity of the branches. They are produced single, between two leaves, are of a white colour, and a cylindrical or pitcher like shape.

(3.) **ANDROMEDA MARIANA**, a native of North America, is a low shrub, sending out many woody stalks from the root, which are garnished with oval leaves, placed alternately; the flowers are collected in small bunches, are of an herbaceous colour, and shaped like those of the strawberry tree. They appear in June and July.

(4.) **ANDROMEDA PANICULATA**, is a native of Virginia and Carolina, growing in moist places. The plants usually arrive at the height of ten feet with thin leaves set alternately, and having the edges finely serrated. The flowers are tubular, small, and of a greenish white, closely set horizontally on one side of the slender stalks. The flowers are succeeded by berries, which open when ripe; and divide into five sections, including many small seeds.

(5.) **ANDROMEDA POLIFOLIA** is a low plant growing naturally in bogs in the northern countries. It is not easily preserved in gardens; and being a plant of no great beauty, is seldom cultivated. These four last species are hardy plants. They succeed best, however, upon boggy and moist grounds. The seeds must be procured from the places where they grow naturally; a year before which, the moistest part of the garden should be dug, and the roots of all weeds cleared. As the weeds begin to rise, the ground should again be dug, and sea or drift sand should be plentifully mixed with the natural soil. Till the seeds arrive, the ground being made tolerably fine, the seeds should be sown very shallow in the boggy land; or if the land should be so boggy that it cannot be easily worked, to be proper for the reception of the seeds, then let a sufficient quantity of soil from a fresh pasture, mixed with sand, be laid over the bog, and let the seeds be sown therein. The bog will in time absorb the soil, but the seeds will come up; and this is the most effectual method of procuring plants of this kind from seeds. The first year after they come up, they should be shaded in very hot weather, after which, they will require little or no care. Another method of increasing these shrubs, is by layers or suckers. These should be planted in a boggy situation, and in a very little time they will increase: for they throw out suckers in prodigious plenty, and, if the situation suits them, to a great distance. These may be taken off, and planted where they are to remain.

(III.) **ANDROMEDA**

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tree. It grows to the high trunk usually 5 or 6 inches are slender, thick set with the pear tree. From the proceed many slender stalks, which hang many small white the strawberry plant. This is from frost in winter, and after

(1.) *ANDRONEPA CALYCE* Sibers. and likewise of it grows on mossy land, and is cult to keep in gardens. Th like those of the box tree, a confidence, having several them. The flowers grow at the extremity of the branched single, between two leaves and a cylindrical or

(3) *ANDROMEDA* *sp.*
America, is a low bush,
woody stalks from the root,
with oval leaves, placed alter-
nately, collected in small bunches;
greenish colour, and shaped like
berry tree. They appear in
the autumn.

(4.) *ANDROMEDA*.
Virginia and Carolina. The plants usually arrive at the same time with this leaves set alternately with thin leaves set alternately edges finely serrated. The flowers small, made of a greenish white, mostly on one side of the stem. The flowers are succeeded by a small fruit which divide into 4.

(5) ANDROMEDA VERTICILLATA growing naturally in hogs trials. It is not easily being a plant of so great botanical interest. These four last species are common.

They succeed best, however, in the moist grounds. The seeds on the places where they grow so fast, the most part of which, the roots of it be dug, and the roots of it As the weed, begin to rise. If again dug, and sea or drift is fully mixed with the natural surface, the ground being and the given very sh

freeds should be to the land; or if the land should cannot be calve worked, to the ception of the freeds, then let of fash from a fresh pasture land, be laid over the bog, and sow therein. The bog will soon, but the freeds will come most effectual method of producing land from freeds. The first step, they should be fluted; after which, they will require Another method of increasing layers or suckers. There is a boggy situation, and so a very plenty, and, if the soil is great distance. These are the

mythology, the daughter
 and wife of Perseus,
 lived from a sea mon-
 ster exposed to be devour-
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metry, the name of a
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re compositions of that
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r day, that occasioned
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rehearsing verses, and
See ANDREA.
ners of the middle age,
rum skins.

antiquity, denotes the
ed for the use of men ;
posed to *Gymnasium*.—
dining rooms the title
am had no admittance

quity, a street, or public and covered together: is more especially two houses, in which the term *andron*, for two apartments, is the men. Anciently men and women to have ces of worship, where tions afunder; which served in the Greek *andron*, was on the , and the women's a

been put under his usurped the throne in perated at his cruel-
lus emperor, put An-
t has eyes, and, ha-
ly in an ignominious

er of Constantinople,
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, built at Athens, an carved on each side, winds. A brais tri-nd in its hand, which sted to the quarter, model is derived the boks on keepers.

c, the name of a physician, named Anaxagoras, against its ingredients, action, are the *squamar* vesicle, *alumen* ruminand frumkinense, all

9) A N D
wrought up with wine. Celsus gives another re-
cipe, and Aetius a third.

ANDROPHAGI, [from *andros*, a man, and *phago*, I eat.] a nation of cannibals, whose country, according to Herodotus, was adjacent to Scythia. They are represented, as the most barbarous and fierce of all nations. They were not governed by laws the care of their cattle was their chief employment. Their dress was like that of the Scythians: and they had a language, peculiar to themselves. See **ANTHROPOPHAGI**.

ANDROPOGON, or MAN'S-HEAD, 1 genus of the *erectaria* order, belonging to the polygynia class, and in the natural method ranking under the 4th order, Gramina. The hermaphrodite calyx is a one-flowered hvalved glume. The corolla is a bivalved glume awn'd at the base. The fruit consists of three capillary filaments; the anthers are oblong and bifurcated. The pistillum has an oval germ, with two capillary filaments, and a villous stigma. There is no pericarpium; the seed is oval, foliately, and covered. The male calyx, corolla, and filament are withered. The female calyx, corolla, and filament are the same with the hermaphrodite; but the corolla without the awn.—There are above 18 species. Of these the most remarkable is

ASPHODOGON VARDOS, which produces the Indian zard, or spikebrand of the shops. The spikebrand, as brought from the East Indies, is a congress of small fibres issuing from one head, as matted close together, so as to form a bunch about the size of the finger, with some small fibrils at the extremities of the head. The matted fibres (which the natives of the East Indies use for medicinal purposes) are supposed by some to be the roots of the spike of the plant; by others the root; they seem rather to be the remains of the withered stalks, or pieces of the leaves: sometimes entire leaves and ribbons of stalks are found among them, we likewise now and then meet with a number of these bunches issuing from one root. Spikebrand has a warm, pungent, bitterish taste; and a strong, not disagreeable smell. It is formicacid and carminative. It is said to be antispasmodic, diuretic, and emmenagogue; but at present it is very little employed.

(1) **ANDROS**, an island lying between Tenos and Euboea: being one mile distant from the former, and ten from the latter. It is one of the ancient Cyclades. The ancients gave it various names, viz. *Cyros*, *Lalla*, *Notwigia*, *Epargia*, *Androsia*, and *Hydrusia*. The name of *Andros* is received from one *Andreas*, appointed, according to *Diodorus Siculus*, by *Rhadamantion*, one of the generals, to govern the Cyclades, after they had taken the island over submitted to him. As to the name of *Hydrusia*, *Strabo* tells us, that *Andros* the son of *Aeneas*, being taken prisoner by the Pelopians, gave them this island for his ransom, which on that account was called *Androsia*, or "delivered for one man." The name of *Hydrusia* it obtained in common with other places well supplied with water. It had formerly a city of great note, bearing the same name, and situated very advantageously on the brow of a hill, which commanded the whole coast. In this city, according to *Strabo* and *Pliny*, the

Abstract

Miliaria. Its signs, are an erysipelas or the ~~lunar~~, returning every new moon, by which the lymphatics, being eroded, pour a serous substance into the cavity of the scrotum. The ~~lunar~~ is incurable; those once seized with it live for life: but it is not dangerous, nor very troublesome, to those used to it; though sometimes it degenerates into an hydrosarcocele. The mode of prevention is by a heap of sand fetched from the province Mangatti, and strowed on the scrotum. This is practised by the rich. The only palliative, viz. by drawing off the serum from the scrotum, once a month.

ANDRUSSOW, a village of Russia, in Smolensk.

ANDRYALA, DOWNY SOW-THISTLE: A genus of the polygamia æqualis order, belonging to the ligulata class of plants; and in the natural method ranking under the 49th order, compositæ: *Andryala*. The essential characters are: The corolla is villous; the calyx is many-parted, terminal, and rounded; and the pappus is simple and scabrous. The species are,

1. **ANDRYALA INTEGRIFOLIA** is an annual plant, growing naturally in the south of France, Spain, and Italy. It rises to the height of a foot and a half, with wholly branching stalks. The flowers are produced in small clusters at the top of the stalks. They are yellow, and like those of the sow-thistle, do not make any great appearance.

2. **ANDRYALA LANATA** is a native of Sicily and the country round Montpellier. The lower leaves are indented and woolly, but those on the stem are entire. It seldom rises more than a foot, supporting a few yellow flowers at top.

3. **ANDRYALA RAGUSINA** is a native of the Cape of Good Hope. The leaves are extremely white, and are indented on their edges. The flower-stalks grow about a foot high, having small clusters of yellow flowers, which appear in July. The seeds sometimes ripen in Britain, but not always.

4. **ANDRYALA SINUATA** grows in Spain and Portugal: the leaves are broader, longer, and more deeply, than either of the other sorts; the flower-stalks rising more than a foot high. They branch into several foot-stalks, each sustaining one or two yellow flower, shaped like those of hawk-bit, which are succeeded by oblong black seeds covered with down. All these plants are easily propagated by seeds, which should be sown in the place, where they are to remain, and will require no other culture than to thin them where they are too close, and to keep them free from weeds. The 2d sort must have a light dry soil, and will not live in this country.

ANDRZEJOW, a small town in Cracow.

ANDST, a district in N. Jutland.

ANDUJAR, or } a large and populous city of
ANDUXAR, } Andalusia, in Spain, seated
near Guadalquivir, 25 m. E. of Cordova. It is differently rich, and defended by a good castle. adorned with handsome churches and several noble houses, and inhabited by many families of high rank. The land about it abounds in corn, oil, honey, and fruit of all sorts; and the merchants carry on a considerable trade in silk.
Long. 4. 3. W. Lat. 37. 45. N.

Vol. II. PART I.

ANDUX, or } a town of France, in the de-
ANDUZÉ, } partment of Herault, seated on
the river Gardon, 25 m. N. of Montpellier. It carries on a considerable trade in serges and woollen cloth. Long. 3. 42. E. Lat. 43. 39. N.

ANDWORTSKOW, a district of Zealand.

(1.) **To ANEAL**, *v. a.* to bake or harden glass, tiles, &c. in the fire. *Bailey*.

(2.) **To ANEAL**, in metallurgy, to give gold, silver, or copper, a red heat.

ANEAU, Bartholomew, a native of Bourges in France, a man of learning in the 16th century, educated under Melchior Volmar. He was professor at Lyons, where he propagated the doctrines of the Reformation secretly for a long time: but on the festival of the Holy Sacrament 1565, as the procession was passing on towards the college, there was a large stone thrown from one of the windows upon the Host and the priest who carried it. The people, enraged at this, broke into the college, and assassinated Mr Aneau, whom they imagined to have been the occasion, and the college itself was shut up next day by order of the city.

(1.) * **ANECNOTE**. *n. f.* [*ανηδοτον*.] 1. Something yet unpublished; secret history.—

Some modern *anecdotes* aver,

He nodded in his elbow chair.

Prior.

2. It is now used, after the French, for a biographical incident; a minute passage of private life.

(2.) **ANECNOTE**, more properly denotes a relation of detached and interesting particulars. The word is Greek, *anadota*, *q. d.* things not yet known, or hitherto kept secret. Procopius gives this title to a book which he published against Justinian and his wife Theodora; and he seems to be the only person among the ancients, who has represented princes such as they are in their domestic relation.—Varillas published *Anecdotes of the House of Medicis*.

(3.) **ANECNOTES** is also an appellation given to such works of the ancients as have not yet been published. In which sense, M. Muratori gives the name *Anecdota Græca* to several writings of the Greek fathers, found in the libraries, and first published by him.—F. Martene has given a *Thesaurus Anecdotarum Novus*, in 5 vols. folio.

ANEE, in commerce, a measure for grain, used in some provinces of France. At Lyons, it signifies also a certain quantity of wine, which is the load an ass can carry at once: which is fixed at 80 English quarts, wine-measure.

ANEGADA, one of the Caribbee Islands. Long. 64. 7. W. Lat. 18. 40. N.

ANELACIUS, a dagger. *Bailey*.

ANELE, indigo. *Bailey*.

ANEMIUS FURNUS, among chemists, a wind furnace; used to make fierce fires for melting, &c.

* **ANEMOGRAPHY**. *n. f.* [*ανημος* and *γραφω*.] The description of the winds.

ANEMOMACHIA, [from *anemos*, wind, and *μαχη*, fight,] in some ancient writers, denotes a whirlwind, or hurricane. In which sense, we sometimes also meet with *anemozale*, *anemotaraxis*, &c.

(1.) * **ANEMOMETER**. *n. f.* [*ανημος* and *μετρον*.] An instrument contrived to measure the strength or velocity of the wind.

(1.) ANEMOMETERS of various kinds have been invented at different times, and by different persons. The one, represented in Plate XIV. has been often experienced, and found to answer the intention.—An open frame of wood, ABCDEFGHI, is supported by the shaft or arbor I. In the two cross-pieces H K, L M, is moved a horizontal axis Q M, by means of the four sails, *ab, cm, Of, gb*, exposed to the wind in a proper manner. Upon this axis is fixed a cone of wood, MNO; upon which, as the sails move round, a weight R, or S, is raised by a string round its superficies, proceeding from the smaller to the larger end N O. Upon this larger end or base of the cone, is fixed a rocket wheel *k*, in whose teeth the click X falls, to prevent any retrograde motion from the depending weight.—The structure of this machine sufficiently shows that it may be accommodated to estimate the variable force of the wind; because the force of the weight will continually increase as the string advances on the conical surface, by acting at a greater distance from the axis of motion; consequently, if such a weight be added on the smaller part M, as will just keep the machine in equilibrio in the weakest wind, the weight to be raised as the wind becomes stronger, will be increased in proportion, and the diameter of the cone N O may be so large in comparison to that of the smaller end at M, that the strongest wind shall but just raise the weight at the greater end.—If, for example, the diameter of the axis be to that of the base of the cone N O as 1 to 28; then, if S be a weight of one pound at M on the axis, it will be equivalent to 28 pounds when raised to the greater end: if therefore, when the wind is weakest, it supports one pound on the axis, it must be 28 times as strong to raise the weight to the base of the cone. If therefore a line of scale of 28 equal parts be drawn on the side of the cone, the strength of the wind will be indicated by that number on which the string rests.

(I.) * ANEMONE. *n. f.* [*anemōnē*.] The wind flower.—Upon the top of its single stalk, surrounded by a leaf, is produced one naked flower, of many petals, with many stamina in the centre; the seeds are collected into an oblong head, and surrounded with a copious down. The principal colours in *anemonies*, are white, red, blue, and purple sometimes curiously intermixed. *Miller*.

(II.) ANEMONE, WIND FLOWER: A genus of the polygamia order, belonging to the polyandria class of plants; and, in the natural method, ranking under the 26th order, Multifloræ. It has its name from the Greek *ανμός*, signifying the wind; because the flower is supposed not to open unless the wind blows.—The characters are: There is no calyx: The corolla consists of petals of two or three orders three in each series, oblongish: The stamina consist of numerous capillary filaments; the antheræ didymous and erect. The pistillum has numerous germina collected into a head; the styli are pointed; the stigmata obtuse: There is no pericarpium; the receptaculum is globular: The seeds are very numerous.—Of this genus Dr Linnaeus enumerates 21 species; but those valuable on account of the beauty of their flowers are only the following:

1. ANEMONE APPENNINA is a native of Britain,

and grows in woods. The flowers of this species are sometimes single, and sometimes double; the colours are white, blue, or violet. They appear in April.

2. ANEMONE CORONARIA. } These two are natives of the

3. ANEMONE HORTENSIS. } vant, particularly of the Archipelago islands, where the borders of the fields are covered with them the most beautiful colours. When they grow wild, the flowers are commonly single; but in culture they are greatly improved: they become large and double, making some of the greatest ornaments of gardens. Their principal colours are red, white, purple, and blue; some of them finely variegated with red, white, purple, and many intermediate shades of these colours.

4. ANEMONE NEMOROSA grows wild in woods in many parts of Britain, where it flows in April and May. The flowers are white, purple, or reddish purple, sometimes single, and sometimes double, so that they make a pretty appearance. They are propagated like the first.

(III.) ANEMONE, CULTIVATION, &c. OF THE
The 1st and 4th species may be propagated by taking up their roots when the leaves decay, and transplanting them into wildernesses, where they will thrive and increase greatly if they are not disturbed. The 2d and 3d species require a good deal of care, and ample directions for their culture.—The soil, in which these flowers will thrive extremely, may be composed in the following manner: Take a quantity of fresh untried earth (from a common or pasture land), of a light fine loam or hazel mould, observing not to take it more than ten inches deep below the surface; and if a turf be taken with it, the better, provided it has time to rot thoroughly before it is used: mix this with a third part of rotten cow-dung, and lay it in a heap, keeping it turned over at least once a month for 8 or 10 months, the better to mix and rot the dung and turf, and to let it have the advantages of the free air. All great stones should be taken out, and the clods broken; but the earth should not be sifted. This should be mixed 6 months before it is used, if possible: but if constrained to use it sooner, it must be often turned over, observing to take out all the parts of the green swaird that are not quite rotten, as this would be prejudicial to the roots. The beginning of September is a proper season to prepare the beds for planting, which (if in a wet soil) should be raised with this sort of earth 6 or 8 inches above the surface of the ground, laying at the bottom some of the rakings of the heap to drain the moisture; but, in a dry soil, 3 inches above the surface, will be sufficient: this compost should be laid at least 2 feet and a half thick, and in the bottom there should be about 4 or 5 inches of rotten neats dung, or the rotten dung of an old melon or cucumber bed. The beds must be laid (if in a wet soil) a little round, to shoot off the water; but in a dry one nearer to a level. In wet land, where the beds are raised above the surface it will be proper to fill up the paths between them in winter, either with rotten tan or dung, to prevent the frost from penetrating into the sides of the beds, which otherwise may destroy their roots. The earth should be laid in the beds at least fortnight

Eight or 3 weeks before the roots are planted, (the longer the better,) that it may settle; when they are planted, stir the upper part of the bed about 6 inches deep, with a spade; then rake even, and with a stick draw lines each way of the bed at 6 inches distance, so that the whole may be in squares, that the roots may be planted regularly: then with 3 fingers make a hole in the centre of each square, about 3 inches deep, lay therein a root with the eye uppermost; and when the bed is finished, rake the earth smooth, and cover the roots about two inches thick. The best season for planting these roots for forward flowers, is about the latter end of September, and for those of a middle season any time in October; but this should be done at or near the time of some gentle showers; for if planted when the ground is dry, and there should no rain fall for weeks or a month after, the roots will be apt to grow mouldy upon the crown; and if once they get this distemper, they seldom prosper. As the fine varieties of these flowers were first obtained from seeds, no good florist should neglect to sow them; for which he should provide himself with a quantity of good roots of the single, which the gardeners call *poppy*, anemones, of the best colours, and such as have strong stems, large flowers, and many leaves; these should be sown early, that they may produce good seeds, which will be ripe in 3 weeks or a month after the flowers are past; when the seeds must be carefully gathered, otherwise they will be blown away, and be inclosed in a downy substance. This seed must be preserved till the beginning of August, when it may either be sown in pots, tubs, or a well-prepared bed of light earth; in doing which, care must be taken not to let the seeds be sown too deep. The best method is to mix them with a little fine sand, and, when sown, gently streak the bed with a strong hair-brush. In about two months after sowing, the plants will begin to appear, if the season has proved favourable. The first year after they appear above ground, they are subject to injuries from hard frosts, or too much wet, against both of which they must be guarded; for the frost is very apt to loosen the roots, so that the young plants are often turned out of the ground, after which a small frost will destroy them; and too much wet often rots their roots, so that all the former trouble may be lost for want of care in this particular: nor is anything more destructive than the cold black frosts and winds of February and March, from which they must be carefully defended by placing a low reed fence on the N. and E. sides of the bed, which may be fastened to a few stakes to support it, and may be taken quite away as the season advances, or removed to the S. and W. sides of the bed, to screen it from the violence of the sun, which often impairs these plants when young. As the spring advances, if the weather should prove dry, they must be gently refreshed with water, which will greatly strengthen the plants; and when the green leaves are decayed, the roots are not too thick to remain in the bed another year, all the weeds and decayed leaves must be swept off the bed, and a little more of the same prepared earth, sifted about a quarter

of an inch thick over the surface. At Michaelmas this should be repeated, but as the roots left in the ground will come up early in autumn, the beds should be carefully covered in frosty weather, otherwise their leaves will be injured, whereby the roots will be weakened, if not destroyed. If the roots succeed well, many of them will flower the second year, when the best may be selected and marked; but none should be destroyed, till after the 3d year, when they blow strong, and their goodness can be determined. The single anemones flower most part of the winter and spring, when the seasons are favourable, if planted in a warm situation, at which time they make a fine appearance, and therefore deserve a place in every flower garden. There are some fine blue colours amongst these single anemones, which, with the scarlets and reds, make a beautiful mixture; and as these begin flowering in January or February, when the weather is cold, they will continue a long time in beauty, provided the frost is not too severe, or if they are covered with mats. The seeds of these are ripe by the middle or end of May; and must be gathered daily as they ripen. Horned cattle, when removed from the higher grounds into woods and woody pastures, frequently eat the wood anemone; and, according to Linnæus and Gunner, many observations have proved that it causes the bloody flux among them.

(IV.) ANEMONE, SEA. See ANIMAL FLOWER.

(1.) ANEMOSCOPE. *n. f.* [*anemos* and *scope*.]

A machine invented to foretel the changes of the wind. It has been observed, that hydrosopes made of cat's gut proved very good *anemoscopes*, seldom failing, by the turning the index about, to foretel the shifting of the wind. *Chambers*.

(2.) ANEMOSCOPE, DESCRIPTION OF THE. This machine consists of an index moving about an upright circular plate, like the dial of a clock, on which the 32 points of the compass are drawn instead of the hours. The index, which points to the divisions on the dial, is turned by a horizontal axis, having a trundle-head at its external extremity. This trundle-head is moved by a cog-wheel on a perpendicular axis; on the top of which a vane is fixed, that moves with the course of the wind, and puts the whole machine in motion. The whole contrivance is extremely simple; and nothing required in the construction, but that the number of cogs in the wheel, and rounds in the trundle-head, be equal; because it is necessary, that when the vane moves entirely round, the index of the dial also make a complete revolution. An anemoscope of this kind is placed in one of the turrets of the queen's palace. There is also one on the W. end of the register office at Edinburgh. The anemoscope calculated for indicating the force or velocity of the wind, is the same with what most writers call an *anemometer*; and we have accordingly described one of those machines under that article. We shall here add another, contrived by the late Mr Pickering, and published in the *Philosophical Transactions*, N^o 473. This anemoscope is a machine four feet and a quarter high, consisting of a broad and weighty pedestal, a pillar fastened into it, and an iron axis of about half an inch diameter fastened into the pillar. Upon this axis turns a wooden tube; at the

the top of which is placed a vane, of the same materials, 21 inches long, consisting of a quadrant, graduated, and shod with an iron rim, notched to each degree; and a counterpoise of wood, as in the figure, on the other. Through the centre of the quadrant runs an iron pin, upon which are fastened two small round pieces of wood, which serve as moveable radii to describe the degrees upon the quadrant, and as handles to a velum or sail, whose plane is one foot square, made of canvas, stretched upon 4 battens, and painted. On the upper batten, next to the shod rim of the quadrant, is a small spring which catches at every notch corresponding to each degree, as the wind shall, by pressing against the sail, raise it up; and prevents the falling back of the sail, upon lessening of the force of the wind. At the bottom of the wooden tube, is an iron index, which moves round a circular piece of wood fastened to the top of the pillar on the pedestal, on which are described the 32 points of the compass. The figure of this machine is given on Plate XIV. where *a* is the pedestal; *b*, the pillar on which the iron axis is fitted; *c*, the circle of wood, on which are described the 32 points of the compass; *e*, the wooden tube upon its axis; *f*, the velum; *g*, the graduated quadrant; *h*, the counterpoise of the vane. The adjoining figure represents the velum, which takes off: *a* is the plane of the velum; *b* the spring; *c*, the wooden radii; *d, d*, the holes through which the pin in the centre of the quadrant goes.

(3.) ANEMOSCOPE, USES OF THE. Having a circular motion round the iron axis, and being furnished with a vane at top, and index at the bottom, when once the artificial cardinal points, described on the round piece of wood on the pillar, are fixed to the same quarters of the heavens, it gives a faithful account of that quarter from which the wind blows. 2. By having a velum or sail, elevated by the wind, along the arch of the quadrant, to an height, proportionable to the power of the column of wind pressing against it, the relative force of the wind, and its comparative power, at any two times of examination, may be accurately taken. 3. By having a spring fitted to the notches of the iron with which the quadrant is shod, the velum is prevented from returning back upon the fall of the wind; and the machine gives the force to the highest blast, since the last time of examination, without the trouble of watching it. The ingenious inventor of this machine tells us, that he carefully examined what dependence may be had upon it, during the storms of February 1743-4, and found that it answered exceeding well; for that, in such winds as the sailors call violent storms, the machine had six degrees to spare, for a more violent gust, before it comes to a horizontal position. It is certainly to be depended upon in ordinary weather, the velum being hung so tenderly, as to feel the most gentle breeze. There is, however, reason to fear, that the exposing the anemoscope to all winds, for a continuance, must disorder it, especially irregular blasts and squalls. It may not, therefore, be amiss, in violent weather, for the observer to take the tube with its vane and velum in his hand, in order to know the force of the

wind; and, when he has finished his observation to carry the machine into the house, till the violence of the storm is abated, when it may be placed in its former situation.

ANEMOSPERMOS. See ARCTOTIS.

ANEMOZALE. See ANEMOMACHIA.

* ANENT. *prep.* A word used in the Scottish dialect. 1. Concerning; about; as, *be said thing anent this particular.* 2. Over against; posite; as, *he lives anent the market house.*

ANER, ESHCOL, and MAMRE, were the Canaanitish princes, who assisted Abraham in pursuit and defeat of Chedorlaomer, and his lies. Not imitating the generosity of that patriarch, they took their share of the booty which had been taken from the Sodomites, and recovered, Gen. xiv. 13,—24.

ANER, a city of the half tribe of Manasseh, the west of Jordan. It was either the same with Taanach, or exchanged for it, 1 Chron. vi. Josh. xxi. 25.

* ANES, AWNS. *n. s.* The spires or beards of corn. *Dist.*

ANET, a large and handsome palace in the north of France, near the Eure, built by Henry II. It is 40 miles from Paris.

ANET, the herb, dill. See next article.

(I.) ANETHUM, DILL and FENNEL: A genus of the digynia order, belonging to the pentandria class of plants; and, in the natural method ranking under the 45th order, umbellata. The essential characters are: The fruit is oval, compressed, striated; and the petals, 5, are involute entire, and very short.

1. ANETHUM FENICULUM, or fennel; of which there are two varieties, the common and the sweet. The sweet fennel is smaller in all its parts than the common, except the seeds, which are considerably larger. The seeds of the two sorts differ likewise in shape and colour; those of the common are roundish, oblong, flattish on one side and protuberant on the other, of a dark, almost blackish colour; those of the sweet are longer, narrower, not so flat, generally crooked, and of a whitish or pale yellowish colour. Both sorts are cultivated in our gardens: the common is a perennial plant; the sweet fennel perishes, after it has given seed; nor do its seeds come to full perfection in this climate, as those which we receive from Germany.

2. ANETHUM GRAVEOLENS, or dill, is an annual plant: the root is long, slender, and white; the leaves are divided into a multitude of fine long, narrow segments like those of fennel, but of a bluish green colour, and less strong smell. The stalk is round and firm, growing to the height of four feet, with yellow flowers, in moderately large umbels.

(II.) ANETHUM, MEDICINAL USES OF THE. Of the first species, the fennel, both the seeds and roots are used in medicine. The seeds of both the fennels have an aromatic smell, and a moderately warm pungent taste: those of the sweet fennel are in flavour most agreeable, and have also a considerable degree of sweetness; hence our colleges have directed the use of the seeds only. They are ranked among the four great hot seeds, and not undeservedly looked upon as good

A N O

AD, a village of Hampshire, near
on
OCIA, a town of ancient Epirus, now
aria. It was almost ruined, during the
zen the Venetians and Turks.
RACUOSE } *adj.* from *anfractus*,
RACUOUS } *Lat.* Winding, & ma-
of turnings and winding passages.—Be-
trum are several vaults and *anfractus*
the ear bone, so to intend the least found
te, that the sense might be affected with
ice in subterraneous caves and vaults,
sound is redoubled. *Ray.*
RACUOUSNESS, *n. f.* [from *anfractus*,
Furrows of windings and turnings.
FRACTURE, *n. f.* [from *anfractus*, *Lat.*]
is, a crazy winding and turning. *Dial.*
ABURY, a village in Hertfordshire, near

ARA, a river of Asiatic Russia.
ARAJ, or **ARAJAN**, in antiquity, public
s, appointed for the carrying of messengers.
cent Persians. Budrus observes, had their
a *zappas*; a set of couriers on horse back,
at certain places, always in readiness to re-
he dispatches from one, and forward them
ther, with celerity, answering to what the
is call *postis*, q. d. *postis*, as being posted at
places or stages.—The *angari* were also
by the Persians *ghandis*, by the Greeks
angaria, on account of the long journeys they
in one day, which according to Strabo ac-
ted to not less than 100 stadia.

ANGARIA, in Roman antiquity, a kind
ulic service imposed on the provincials,
s consisted in providing horses and carriages
re conveyance of military stores, and other
ic burdens. It is sometimes also used for a
d of soldiers, posted for the defence of a
*. In a more general sense, it is used for any
of services performed through compulsion.

ANGARI, in the civil law, a duty required
bjects, to furnish horses and carts, for the con-
nce of corn, &c. for the king's troops. Also an-
ice which one is obliged to perform for another.

NGAZY, one of the Comoro islands, ly-
between the north end of Madagascar and
cast of Zanzibar in Africa, from Lat. 20°
14' S. It is inhabited by Moors, who trade
d very parts of the continent, in cattle, fruits,
d other commodities of the island, which they
hange for calicoes and other cotton cloths.
a houses here are built of stone, and lime made
coloured oyster-shells, with which the walls and
d are plastered in a very elegant manner. The
ment of Angaza is a part aristocracy; the
nd being subject to 20 lords, who have all the
h of *Sultan*. The people are very careful of their
omen, never permitting strangers to sit them,
about permission from a sultan, or an order
high the stranger brings with him. Many of
men read and write Arabic with great facility;
nd some even understand Portuguese, which
ey learn from their intercourse with *Mosam-
que*, whither they trade in vessels of 40 tons
arthen.

ANOEIOGRAPHY, [from *anoeio*, a vessel, and
grapho, to write]

angel, to describe,] the description of all kinds of ancient instruments, vessels, and utensils, both domestic, military, and nautical. Angeiography also includes the consideration of weights, measures, &c.

ANGEIOLOGY, in anatomy, the description of the vessels in a human body; e. g. the nerves, veins, and lymphatics. See ANATOMY, INDEX.

ANGEIOTOMY, in surgery, implies the opening a vein or artery, as in bleeding; and consequently includes both arteriotomy and phlebotomy.

(1.) * ANGEL. *adj.* Resembling angels; angelical.—

I have mark'd

A thousand blushing apparitions
Start into her face; a thousand innocent shames
In *angel* whiteness bear away those blushes.

Shakespeare.

Or virgins visited by *angel* powers,
With golden crowns, and wreathes of heav'n-
ly flow'rs. *Pope's Rape of the Lock.*

(2.) * ANGEL. *n. f.* [*ἄγγελος*; *angelus*, Lat.] 1. Originally a messenger. A spirit employed by God in the administration of human affairs.—

Some holy *angel*

Fly to the court of England, and unfold

His message ere he come. *Shakespeare.*

Had we such a knowledge of the constitution of man, as it is possible *angels* have, and it is certain his Maker has; we should have a quite other idea of his essence. *Locke.* 2. *Angel* is sometimes used in a bad sense; as, *angels of darkness*.—And they had a king over them, which was the *angel* of the bottomless pit. *Revelation.* 3. *Angel*, in scripture, sometimes means *man of God, prophet.* 3. *Angel* is used, in the style of love, for a beautiful person.—

Thou hast the sweetest face I ever look'd on.

Sir, as I have a soul, she is an *angel*. *Shakespeare.*

5. A piece of money anciently coined and impressed with an angel, in memory of an observation of Pope Gregory, that the Pagan *Angli*, or English, were so beautiful, that, if they were Christians, they would be *Angeli*, or *angels*. The coin was rated at ten shillings.—Take an empty basin, put an *angel* of gold, or what you will, into it; then go so far from the basin, till you cannot see the *angel*, because it is not in a right line; then fill the basin with water, and you will see it out of its place, because of the reflection. *Bacon.*—

Shake the bags

Of hoarding abbots; their imprison'd *angels*
Set thou at liberty. *Shakespeare.*

(3.) ANGEL, ETYMOLOGY AND DEFINITION OF. [*Engel*, Teut. from *ἄγγελος*, Gr. a messenger,] a spiritual intelligent substance, the first in rank and dignity among created beings. The Hebrew word *מלאך* signifies the same with the Greek. The angels are in Daniel, (iv. 13, &c.) called *מַלְאָכִים*, or *Watchers*, from their vigilance: for the same reason they are, in the remains we have of the prophecy attributed to Enoch, named *Egregori*; which imports the same in Greek. Angels therefore, in the proper signification of the word, do not import the nature of any being, but only the office, to which they are appointed, especially by

way of message, or intercourse between God and his creatures; in which sense they are called *ministers of God*, who do his pleasure, and *ministering spirits* sent forth to minister for them who shall be heirs of salvation.

(4.) ANGELS, ANCIENT AND GENERAL BELIEF OF. That there are such beings as we call *angels*; that is, certain permanent existences, invisible and imperceptible to our senses, endued with understanding and power superior to that of human nature, created by God, and subject to him the supreme Being; ministering to his divine providence in the government of the world by his appointment, and more especially attending the affairs of mankind; is a truth so fully attested scripture, that it cannot be doubted. Nay, existence of such invisible beings was generally knowledged by the ancient heathens, though under different appellations: the Greeks called them *demons*; and the Romans *genii* or *lares*. Epictetus seems to have been the only one among old philosophers, who, like Zadok and his followers, the Sadducees, among the Jews, absolutely denied their existence. Indeed, the belief of middle intelligences influencing the affairs of the world, and serving as ministers or interpreters between God and man, is as extensive as the belief of a God; having never, so far as we know, been called in question by those who had any religion at all.

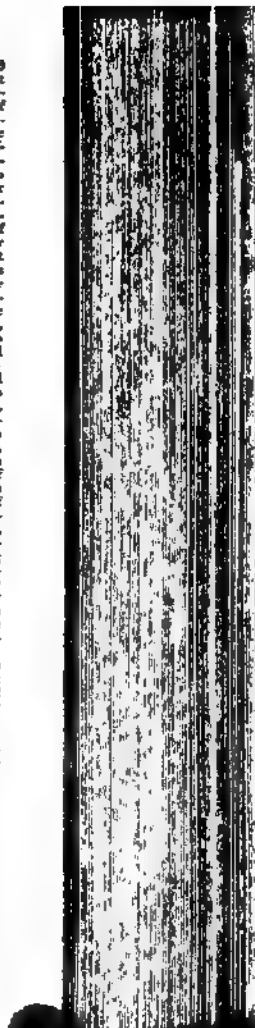
(5.) ANGELS, CREATION OF. The creation of angels is not expressly mentioned by Moses in the first of Genesis, yet it is generally considered by pious expositors as implied. The reason why the sacred historian is silent on this subject, is supposed by Berrington to be the natural propensity of the gentile world, and even of the Jews, to idolatry. And it is thought, if they worshipped mere material elements, which was the case, more might they be inclined to worship such superior and sublime beings as angels. But a better reason is perhaps given by other writers, that this first history was purposely and principally written or information concerning the visible world; the invisible, of which we know but part, being reserved for a better life.

(6.) ANGELS, DISPUTE RESPECTING THE TIME OF THEIR CREATION. Much idle controversy, and many fruitless conjectures, have taken place among the learned, respecting the time when the angels were created. The majority of the logical writers, seem to have taken it for granted, that their creation, though not mentioned by Moses, constituted a part of the Almighty's six days work. Bishop Hopkins insists, that it must have been within the six days creation, because within that space, "God made heaven and earth, and all things that are therein." Lightfoot, Caryl, and others, lay great stress upon the words Gen. ii. 1. "Thus the heavens and the earth were finished, and all the host of them." And Charnock reckons the incipient words of the first chapter, "In the beginning" decisive; "because," says he, "before the beginning of the creation and the beginning of time, there could be nothing but eternity; nothing but what was uncreated; that is, nothing but what was without beginning." This argument is evidently a play upon words.

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erred literally, would involve a contradiction to what we know to be the fact. "Then went out to him Jerusalem and all Judaea, and all the region round about Jordan, and were baptized of him." As no judicious commentator will explain the word *all*, in this passage, to mean more than a great number of the people, so no Christian philosopher, who is acquainted with astronomy, will explain the words *all the host of them*, to imply more than the sun and the planets in our sublunary system, which, considering their magnitudes, distances, and numbers, primary and secondary, (which, from the very late discovery of the *Georgium sidus*, are probably much greater than we have yet discovered,) sufficiently merit the title of a *host*. Considering matters in this view, the argument drawn from the words in the *beginnings* will appear quite inconclusive, for certainly the day of the creation of our globe, is the beginning of time to its inhabitants; and, as such, the only proper era for our sacred historian to date his history from, if myriads of angels, and millions of other worlds, should have been created and existed for many ages before it. Indeed to suppose, with the majority of divines, that no creatures whatever, neither material nor spiritual, neither angels nor other worlds, had been created, previous to the creation of our world, is to suppose, that a Being of infinite power, wisdom, and goodness, had remained totally inactive from all eternity, and had permitted the infinity of space to continue a perfect vacuum, till within these 6000 years! Such narrow-minded ideas of the Almighty and his works, and such forced constructions put upon particular texts by divines, tend to discredit the doctrines of revelation instead of serving it, and to render it contemptible in the eyes of those who have not leisure or inclination to study its miraculous merits. But those who do, upon a strict investigation, will not only discover its peculiar internal beauties, but also that the whole system, when freed from the false glosses of fallible men, contains nothing inconsistent with sound philosophy.

(7.) ANGELS, NATURES AND OFFICES OF. As to the nature of these beings, we are told, that they are spirits, but whether pure spirits devoid of all matter, or united to some thin bodies, or corporeal vehicles, has been a controversy of long standing. Not only the ancient philosophers, but some of the Christian fathers were of opinion, that angels were clothed with ethereal, or fiery bodies of the same nature with those which we shall one day have when we come to be equal to them. But the more general opinion, especially of later times has been, that they are substances entirely spiritual, though they can at any time assume bodies, and appear in human or other shapes. That the angelical powers and abilities vastly exceed those of man, cannot be denied, if we consider, that their faculties are not clogged or impeded, as ours are, by any of those imperfections which are inseparable from corporeal beings, so that their understandings are always in perfect vigour; their inclinations regular, their motions strong and quick; the actions irresistible by material bodies, whose natural qualities they can control, or manage to their purposes, and occasion either blessing or



or calamities, public or private, here below; instances of which are too numerous to mention. Besides their attendance on God, and their executing his commands, they are also presumed to be employed in taking care of mankind and their concerns: and that every man had such a tutelar or guardian angel, even from his birth, was a firm belief and tradition among the Jews; and our Saviour himself seems to have been of the same sentiment. As the numbers of these celestial spirits are very great, it is likewise reasonable to believe that there are several orders and degrees among them; which is also confirmed by Scripture; whence some speculative men have distributed them into 9 orders, according to the different names by which they are there called; and reduced those orders into three *hierarchies*, as they call them; to the first of which belong seraphim, cherubim, and thrones; and to the second, dominions, virtues, and powers; and to the third, principalities, arch-angels, and angels. They imagine farther, that there are some who constantly reside in heaven; others who are ministers, and sent forth, as there is occasion, to execute the orders they receive from God by the former. The Jews reckon but four orders or companies of angels, each headed by an arch-angel; the first order being that of Michael, and the second of Gabriel, the third of Uriel, and the fourth of Raphael: but though the Jews believe them to be four, yet it seems there were rather seven. The Persians also held, there were subordinate degrees among the angels.

(8.) ANGELS, OPINIONS OF THE HEATHENS CONCERNING. The heathens generally believe in the doctrine of every man having a tutelar angel. They thought it a crime to neglect the admonitions of so divine a guide. Socrates publicly confessed himself to be under the direction of such an angel, or dæmon, as several others have since done. And on this tutelar genius of each person they believed his happiness and fortune depended. Every genius did his best for the interest of his client; and if a man came by the worst, it was a sign the strength of his genius was inferior to that of his opponent, that is, of an inferior order; and this was governed by chance. There were some genii, whose ascendent was so great over others, that their very presence entirely disconcerted them; which was supposed to be the case of that of Augustus in respect of that of Marc Antony. The Romans thought the tutelar genii of those who attained the empire, to be of an eminent order; on which account they had great honours shown them. The nations and cities also had their several genii. The ancient Persians so firmly believed the ministry of angels, and their superintendance over human affairs, that they gave their names to the months, and the days of their months, and assigned them distinct offices and provinces: and it is from them the Jews confess to have received the names of the months and angels, which they brought with them when they returned from the Babylonish captivity. After which we find, they also assigned charges to the angels, and in particular the patronage of empires and nations; Michael being the prince of the Jews,

as Raphael is supposed to have been of the Persians.

(9.) ANGELS, OPINIONS OF THE MAHOMETANS, CONCERNING. The Mahometans have great respect for the angels, that they account a man an infidel who either denies their existence or loves them not. They believe them to be free from sin, enjoying the presence of God, to which they are never disobedient: that they have substantial pure bodies, being created of light; and have no distinction of sexes, nor need the refreshment of food or sleep. They suppose them to have several different forms and offices: that some adore God in several postures; others sing his praises, and intercede for men; some carry and encompass his throne; others write the actions of men, and are guardians to them.

(10.) ANGELS, OPINIONS RESPECTING THE FALLEN. Although the angels were originally created perfect, good and obedient to their Maker's will, yet some of them sinned, and lost not their first estate, but left their habitation, and so, of the most blessed and glorious, became the most vile and miserable of all God's creatures. They were expelled the regions of light, and cast down to hell, to be reserved in everlasting chains under darkness until the day of judgment. With heaven they lost their heavenly disposition, which delighted once in doing good and praising God; and fell into a settled rancour against God, and malice against men: their inward peace was gone; all desire of doing good departed from them; and, instead thereof, revengeful thoughts and despair took possession of them, and created an eternal hell within them. And, for what offence, these apostate spirits fell from heaven, plunged themselves into such an abyss of wickedness and woe, are questions impossible to be determined by any clear evidence of Scripture. At the time, we are certain that it could not be before the sixth day of the creation; because that day it is said, "God saw every thing that he had made, and behold it was very good:" that it was not long after is very probable, and must have preceded the fall of our first parents. Some have imagined it to have been after, that carnality, or lusting to converse with women upon earth, was the sin which ruined them: but this is too ridiculous to bear refutation. Others have supposed, that the angels, being informed of God's intention to create man after his own image, and to dignify his nature by Christ's coming of it, and thinking their glory to be eclipsed thereby, envied man's happiness, and so revolted, and with this opinion that of the Mahometans has some affinity; who are taught, that the dæmon who was once one of those angels who are nearest to God's presence, and named *Azazel*, forfeited paradise for refusing to pay homage to Adam, the command of God. But on what occasion ever it first showed itself, pride seems to have been the leading sin of the angels; who, admiring and valuing themselves too much on the excellency of their nature and the height of their station, came at length to entertain so little respect for their Creator, as to be guilty of downright rebellion and apostasy. It is certain from Scripture,

A N G

ANGUSTICA. A genus of the digynis or-
gizing to the pentandria class of plants;
natural method ranking under the 45th
tribe. The essential characters are:
the corolla is roundish, angled, solid, with reflect-
ed lobes; the corolla is equal, and the petals in-

ANGUSTICA ARCTO-ANGUSTICA is a native of
and Germany. The leaves are much
in those of the common angelica, and the
are yellow.

ANGUSTICA ARCTO-ANGUSTICA. These two
ANGUSTICA LUCIDA. These are
of North America, and have both the ad-
vantage of *Lonicera*, from their abounding
in them, but have no great beauty, nor any
virtue yet known.

ANGUSTICA SATIVA, or common angelica,
is cultivated in gardens for medicinal use,
and for a sweetmeat, grows naturally in
them countries. The root of this species
is, oblong, and an inch or two thick, fra-
gid and acrid. The leaves are very large, com-
poundly pinnated, of an oblong oval figure,
cut at the edge, and the odd leaf at the end
pinnately lobed; the stalk is round, bristled,
thick as a child's arm. The umbels are
large, and of a globose figure; the flowers
small, and greenish. This species grows in
the fields. The seeds should be sown soon after
they are ripe. When the plants come up about
three high, they should be transplanted very
as their leaves spread greatly. If they are
sown on the sides of ditches or pools of water,
at three foot distance, they will thrive exceed-

ANGUSTICA SYLVESTRIS grows naturally in
the meadows, and by the sides of rivers, in mas-
sachusetts of Britain, but is seldom admitted into
gardens.

V. ANGUSTICA, used of the, is medicinal.
The properties of medicines, Bohemia and Spain
have the best kinds of angelica. The London
apothecaries direct the roots brought from Spain to be
the middle use of. Angelica roots are apt to
become mouldy, and be preyed upon by insects,
and thoroughly dried, kept in a dry place,
and frequently aired. It is probable that the roots
which are subject to this inconvenience might be
cleared, by dipping them in boiling spirit, or
putting them to its steam, after they are dried.
The parts of angelica, especially the root, have
a fragrant aromatic smell, and a pleasant bitterish
acrid taste, glowing upon the lips and palate for
long time after they have been chewed. The
essence of the seeds and leaves is very perishable,
particularly that of the leaves, which, on being
thoroughly dried, lose the greatest part of their taste
and smell: the roots are more tenacious of their
essence, though even these lose part of it upon
reaping. The fresh root, wounded early in the
spring, yields an odorous, yellow juice, which
lowly evaporated, proves an elegant gummy resin,
very rich in the virtues of the angelica. On dry-
ing the root, this juice concretes into distinct an-
gustica, which, on cutting it longitudinally, appears
attributed to little veins: in this state, they are
extracted

extracted by pure spirit, but not by watery liquors.—Angelica is one of the most elegant aromatics of European growth, though little regarded in the present practice. The root, which is the most efficacious part, is used in the aromatic tincture; and the stalks make an agreeable sweet-meat.

(V.) ANGELICA WATER, a compound water, so called from the *angelica* root, which is the chief ingredient in the composition.

(VI.) ANGELICA, WILD. See *ÆGOPodium*.

(VII.) ANGELICA, in Grecian antiquity, a celebrated dance performed at their feasts.—It was thus called, from *αγγελος*, *nuncius*, messenger; because, as Pollux assures us, the dancers were dressed in the habit of messengers.

ANGELICÆ, or ANGELICS, a congregation of nuns, founded at Milan in 1534, by Louisa Torelli, countess of Guastalla. They observe the rule of St Augustine.

* ANGELICAL. *adj.* [*angelicus*, Lat.] 1. Resembling angels.—It discovereth unto us the glorious works of God, and carrieth up, with an *angelical* swiftness, our eyes, that our mind, being informed of his visible marvels, may continually travel upward. *Raleigh*. 2. Partaking of the nature of angels.—

Others more mild

Retreated in a silent valley, sing

With notes *angelical* to many a harp,

Their own heroic deeds, and hapless fall

By doom of battle. *Milton*.

3. Belonging to angels; suiting the nature or dignity of angels.—It may be encouragement to consider the pleasure of speculations, which do ravish and sublime the thoughts with more clear *angelical* contentments. *Wilkins's Dædalus*.

* ANGELICALNESS. *n. s.* [from *angelical*.] The quality of being angelical; resemblance of angels; excellence more than human.

ANGELICI. See ANGELICS.

* ANGELICK. *adj.* [*angelicus*, Lat.] Partaking of the nature of angels; angelical; above human.—

Here happy creature, fair *angelick* Eve,

Partake thou also. *Milt. Par. Lost*.

My fancy form'd thee of *angelick* kind,
Some emanation of th' all beauteous mind:

Pope.

(1.) ANGELICS, ANGELICI, an order of knights, instituted in 1191, by Isaac Angelus Comnenus emperor of Constantinople.

(2.) ANGELICS, in church history, an ancient sect of heretics, supposed by some to have got this appellation from their excessive veneration of angels; and by others, from their maintaining that the world was created by angels. See ANGELICÆ.

ANGELICUS PULVIS, a title given by Schroeder, to *Mercurius vite*.

ANGELINA ZANONI ACOSTÆ, in botany. This is a tree of vast size, sometimes above 16 feet thick, growing on rocky and sandy places in Malabar, in the East Indies. It bears ripe fruit in December, and continues bearing for a whole century. The dried leaves heated, are said to alleviate pains and stiffness in the joints, and discuss an intumescence of the testes, occasioned by a contusion, or any external violence; as also an *hydrocele*, or *pneumatocèle*. It is efficacious like-

wise in venereal complaints and hemorrhoid fluxes.

ANGELITES, in ecclesiastical history, a sect of Christian heretics, in the reign of the emperor Anastasius, and the pontificate of Symmachus, about the year 494, so called from Angelium, where they held their first meetings. They were called likewise *Severites*, from Severus, who was the head of their sect; as also *Theodosians*, from one among them named Theodosius, whom they made pope at Alexandria. They held, that the persons of the Trinity are not the same; that none of them exists of himself, and of his own nature; but that there is a common god or deity existing in them all, and that each is God, by participation of this deity.

ANGELIUM, a place in Alexandria, where the sect of Angelites met.

ANGELO, Michael, the name of 5 celebrated Italian painters, who flourished in the 16th and 17th centuries; but of whom we shall only mention the two most distinguished.

1. ANGELO, Michael, de Buonarrotti, was most incomparable painter, sculptor, and architect, born in 1474, in the territory of Arezzi, Tuscany. He was the disciple of Dominico Ghilandaio; and erected an academy of painting and sculpture in Florence, under the patronage of Lorenzo de Medicis; which, upon the trouble of that house, he was obliged to remove to Bologna. About this time he made an image of Cupid, which he carried to Rome, broke off one of its arms, and buried the image in a place he knew would soon be dug up, keeping the arm for himself. It was accordingly found; and sold to Cardinal St Gregory for an antique; until Michael, to their confusion and his own credit, discovered his artifice, and confirmed it by the deficient arm which he produced. It is rather unusual for the manufacturers of antiques to be so ingenious. At the desire of Pope Paul III. he executed his most celebrated picture of The last judgment. He had the character of being the greatest designer that ever lived; and it is universally allowed that no painter ever understood anatomy better. He died immensely rich at Rome, in 1564.

2. ANGELO, Michael, de Caravaggio, born at that village in Milan, 1569. He was at first only a bricklayer's labourer: but he was so charmed with seeing some painters at work, that he immediately applied himself to the art; and made so great progress in a few years, that he was admired as the author of a new style in painting. There is one picture of his in the Dominican church at Antwerp, which Rubens used to call his master. It is said of this painter, that he was so strangely contentious, that the pencil was no sooner out of his hand, than his sword was in it. He died in 1609.

ANGELO, ST, the name of several places in Italy; viz. 1. a strong castle at Rome, whither the Pope retires in times of danger: 2. a castle and 3. a district of Corfu: 4. an impregnable castle in Malta: 5. a seaport town of Apulia, in the Gulf of Venice, 8 miles N. of Manfredonia: 6. a small but strong town in the Capitanata of Naples. Long. 15. 56. E. Lat. 41. 43. N. 7. another town

A N G

is denominated *angeli de Bray*. It is made in vats, either square or shaped.

1. ST. EY, a small town in Somersetshire, Eng.

ANG, in the church history of France, a prayer to the Virgin, established by a council of a bell rung for that purpose! It is called *Ang*, or the anglic salutation. The revolution abolished all such superstitions; we do not suppose that the Directory has since them.

ANGER, *n. f.* A word of no certain origin, but, with most probability, derived from *ango*, Sax. *weard*, which, however, does not come originally from the Latin *angere*, *v.* is uneasiness or discomposure of the mind upon the receipt of any injury, with a propensity of revenge. *Locke*.

Anger is like
A hot horse, who being allow'd his way,
Nettle tires him. *Shak.peare*.
The Lord displeased against the rivers? was
anger against the rivers, was thy wrath against
the sea, that thou didst ride upon thine
and thy chariots of salvation? *Psalm 108*.
It is, according to some, a transient hatred,
cast very like it. *Saith*. 2. Pain, or smart,
re or swelling. In this sense it seems plain-
cible from *angere*.—I made the experiment,
the morn where the first violence of my
be, and where the greatest anger and
s had continued, notwithstanding the sweet-
ness of my *Tranquil*.

ANGER, REFLECTIONS UPON. Anger is dis-
tributed in two kinds, the one is
and unchangeable, because it operates blind-
ly without affording time for deliberation or retri-
bution.

Bishop Butler justly observes, that anger
from being a selfish passion, first it is natu-
rally excited by injuries offered to others as well
ourselves, and was designed by the Author
store not only to excite us to act vigorously
against ourselves from evil, but to interest
in the defence or rescue of the injured and
acts, and to raise us above the fear of the
and mighty oppressor. Neither, therefore,
it anger itself because the precept, "Be ye
ry and sin not."—It becomes sinful, however,
when it is conceived upon slight provocations,
continues long. It is then contrary to the
spirit of charity, which "suffereth long,
it is not easily provoked." Hence these other
cepts, "Let every man be slow to anger;"
"Let not the sun go down upon your
wrath." Such precepts suppose the passion of
get to be within our power. This power con-
sists not so much in any faculty we have of ap-
proaching our wrath at the time for we are passive
under the smart which an injury or affront occa-
sions, and all we can then do is to prevent its
taking out into action, as in so modifying our
minds by habits of just reflection, as to be less wa-
ted by impressions of injury, and to be sooner
soothed.

(2.) ANGER, SEDATIVES OF. Mr Paley, in
his excellent treatise of *Moral and Political Philo-*
sophy.

Joseph, suggests the following considerations, to allay this passion. "The possibility of mistaking the motives, from which the conduct that offends us proceeded; how often our offences have been the effect of inadvertency, when they were mistaken for malice; the inducement, which prompted our adversary to act as he did; that he is perhaps under a contrition, which he is ashamed to confess; that the returns of kindness are sweet, and that there is neither honour, virtue, nor use, in resisting them; that others have their passions, their prejudices, their favourite aims, their sudden impulses, as well as we; that we may recollect what hath sometimes passed in our own minds, when on the wrong side of a quarrel, and imagine the same to be passing in our adversary's mind; when we become sensible of our misbehaviour, what palliations we perceived in it, and expected others to perceive; how we were affected by the kindness of a generous reception and ready forgiveness; how persecution revived our enmity, and seemed to justify the conduct in ourselves which we before blamed; add to this, the indecency of extravagant anger; how it renders us, whilst it lasts, the scorn of all about us; of which it leaves us, when it ceases, sensible and ashamed; the inconveniencies into which it has sometimes betrayed us; the friendship it has lost us; the embarrasments in which we have been involved by it, and the repentance, which, on one account or other, it always costs us. But the reflection, calculated, above all others, to allay anger, is, that we ourselves are, or shall be, suppliants for mercy and pardon, to the judgment seat of God. Imagine our secret sins all disclosed; imagine us thus humbled, trembling under the hand of God; casting ourselves on his compassion; crying out for mercy—imagine such a creature to talk of revenge, refusing to be intreated, disdaining to forgive, extreme to resent what is done amiss; and you can hardly feign to yourself, an instance of more impious, and unnatural arrogance."

(4.) ANGER, VIOLENT, SURPRISING EFFECTS OF. Physicians and naturalists afford instances of very extraordinary effects of this passion. *Borrichius* cured a woman of an inveterate tertian ague, which had baffled the art of physic, by putting the patient in a furious fit of anger. *Valerola* made use of the same means, with the like success, in a quartan ague. The same passion has been equally salutary to paralytic, gouty, and even dumb persons; to which last it has sometimes given the use of speech. *Etmuller* gives divers instances of very singular cures wrought by anger; among others, he mentions a person laid up in the gout, who, being provoked by his physician, flew upon him, and was cured. It is true, the remedy is somewhat dangerous in the application, when a patient does not know how to use it with moderation. We meet with several instances of princes, to whom it has proved mortal, e. g. *Valentinian I.* *Wenceslaus*, *Matthias Corvinus* king of Hungary, and others. There are also instances, wherein it has produced the epilepsy, jaundice, cholera morbus, diarrhoea, &c. In fact, this passion is of such a nature, that it quickly throws the whole nervous system into unnatural commotions, by a violent stricture

of the nervous and muscular parts; and surprisingly augments, not only the systole of the heart and of its contiguous vessels, but also the tone of the fibrous parts in the whole body. It is certain, that this passion, by the spasmodic stricture it produces in the parts, exerts its power principally on the stomach and intestines, which are highly nervous and membranous parts, whence the symptoms are more dangerous in proportion to the greater consent of the stomach and intestines, with the other nervous parts, almost with the whole body. The unhappy influence of anger likewise, on the biliary and pancreatic ducts, is very surprising; since, by an intense constriction of these, the liver is not rendered schirrous, but stones also are often generated in the gall bladder and biliary ducts. These accidents have scarcely any other origin than an obstruction of the free motion and efflux of the bile, by means of this violent stricture. From such a stricture, likewise, proceeds jaundice, which, in process of time, lays a foundation for calculous concretions in the gall bladder. By increasing the motion of the fluids, the spasms of the fibrous parts, by means of anger, a larger quantity of blood is forcibly pressed to certain parts; whence it happens, that they are too much distended, and the orifices of the veins distributed there, opened. It is evident from experience, that anger has a great tendency to excite enormous hæmorrhages, either from the nose, the aperture of the pulmonary artery, the veins of the anus; or in women, from the uterus, especially in those previously accustomed to such evacuations.

* *To ANGER*. *v. a.* [from the noun.] 1. To make angry; to provoke; to enrage.—*Would anger the meanest artisan, which carried a good mind? Hooker.*

Sometimes he *angers* me.
With telling me of the moldwarp and the

Shakespeare
There were some late taxes and impositions introduced, which rather *angered* than grieved people. *Clarendon.*

It *anger'd* Turenne, once upon a day,
To see a footman kick'd that took his pay.

2. To make painful.—He turneth the humor back, and maketh the wound bleed inwards, *angereth* malign ulcers, and pernicious impostumations. *Bacon.*

* *ANGERAP*, a river of Prussia, which, united with the Inster, near Insterburg, forms the navigable river, *Premier*.

ANGERBURG, the name of 1. a district in Prussia; 2. a lake, from which the Angerap river issues; and 3. a well built town of Prussia, surrounded with palisades, which has a strong castle, built 1335, on the lake.

* *ANGERLY*. *adv.* [from *anger*.] In an angry manner; like one offended: it is now written *angrily*.—

Why, how now, Hecat, you look *angry*!
Shakespeare
Such jester's dishonest indiscretion, is rather creditably to be pitied, than their exception either

) A N G

once rent a street of the same name. On one
 side of this street is the town-house; which has a
 tall tower, with a clock, raised upon an arch,
 that serves for a passage into the great square.—
 There are two large bridges, which keep up a
 communication between the two parts of the city;
 and in the latter of these there is another square,
 which serves for a market. The university of
 Angers was founded in 1298, and the academy of
 Belles lettres in 1681. This last consists of 30
 academicians. At the end of the suburbs of Bee-
 nigny are the quarries of Angers, famous for fine
 flints, of the thickness of a crown piece, and a
 foot square. All the houses in Angers are cover-
 ed with this flint, which has gained it the appella-
 tion of the *Black City*. The walls, with which
 king John of England surrounded it in 1174, re-
 main nearly entire, and are of very great circum-
 ference. Long. 0. 30. W. Lat. 47. 28. N.

ANGERTON, two English villages; viz. 1.
 in the Holme, Cumberland, a near Morpeth.

ANGETENAR, in the Arabian astronomy,
 denotes a fixed star of the 4th magnitude, in the
 body of Capri, or the whale.

ANGEZELA, one of the Comora Islands.

ANGHIARA, a village of Tuscany.

ANGHIERA, 1. a county of Italy, in the
 duchy of Milan, and 2. a town, the capital of
 that county; situate on the eastern side of the lake
 Maggiore. Long. 9. 7. E. Lat. 45. 43. N.

ANGI, among physicians, their term for
 the groin called bubo.

ANGIGLOSSI, (from *angis*, to be stout, and
glossa, the tongue,) denotes those who speak with
 hesitation, or stammering.

ANGILDUM, an ancient apothem, (from *angis*,
 and *gild*, price, Sax.) a simple gold, that is, the
 simple value of any thing. It is distinguished from
compensatum, a double compensation; *trigridum*, a
 triple compensation.

ANGINA, in medicine, a violent inflammation
 of the throat, otherwise called quinsy. See *Me-
 dicina*, *Index*.

ANGINA GARGORENSIS, or *angina*, the ulcer-
 ated, malignant, putrid sore throat; on which
 there are various treatises by Forbergil, Huxham,
 Northeast, &c.

ANGINA LILI, in botany, a name used by some
 of the later Greek writers to express what the
 more ancient writers of this nation called *Amorcanus*,
 and the Latins *epithymum*; this was the cuculus or
 dodder growing on the flax, as that on the thyme
 was called *epithymum*. It was called *angina lili*,
 the quinsy of flax; from its choking that plant.

ANGINA PECTORIS. See *Medicina*, *Index*.

ANGIOGRAPHY *n. s.* (from *angis* and *grap-
 he*.) A description of vessels in the human body;
 Serous, vascular, arteries, and lymphatics.

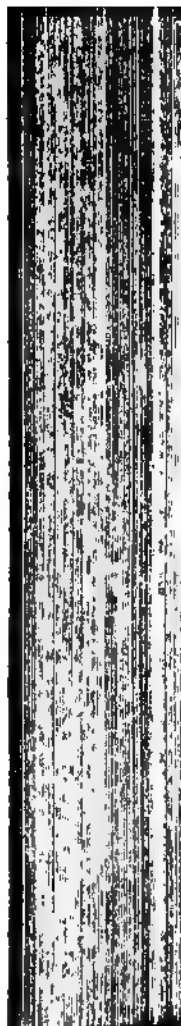
ANGIOLOGY *n. s.* (from *angis* and *logos*.)
 A treatise or discourse of the vessels of a human
 body.

ANGIOMONOSPERMOUS *adj.* (from *angis*,
monos, and *sperma*.) Such plants as have but
 one single seed in the seed-pod.

ANGIOSPERMIA, in the Linnæan system of
 botany, the second order in the class Dicotyledones.

It consists of those plants, of that class, whose
 seeds are inclosed in a pericarpium. In this order
 the

1 the de-
 near the
 Maine, 45
 miles the
 13 parish-
 ch contain
 200 inhabi-
 the declivity
 river side—
 out the mid-
 , fofies, and
 evince its fur-
 in the cen-
 ay the river,
 formerly the
 Sicily, as duha
 rabic structure.
 1 the renowned
 f of Sicily, and
 the expired,
 il efforts, to re-
 in 1482, at the
 urch of St Mi-
 the city, from



the stigma generally obtuse. These are the personati of Tournfort.

* ANGIOTOMY. *n. f.* [from *angion* and *tomos*, to cut.] A cutting open of the vessels, as in the opening of a vein or artery.

ANGITIA, the sister of Medea, who taught antidotes against poison and serpents, according to Sil. Italicus; though Servius on Virgil says that Medea herself got this name for the same reason.

ANGITÆ LUCUS, or NEMUS, in ancient geography, a town of Naples situated on the W. side of the Lacus Fucinus, now called Luco.

ANGLARS, a town of France, in the department of Puys-de-dome.

(1.) * ANGLE. *n. f.* [*angle*, Fr. *angulus*, Lat.] The space intercepted between two lines intersecting or meeting, so as, if continued, they would intersect each other. *Angle of the centre of a circle*, is an *angle* whose vertex, or angular point, is at the centre of a circle, and whose legs are two semidiameters of that circle. *Stone's Dict.*

(2.) * ANGLE. *n. f.* [*angel*, Germ. and Dutch.] An instrument to take fish, consisting of a rod, a line, and a hook.—She also had an *angle* in her hand; but the taker was so taken, that she had forgotten taking. *Sidney.*

Give me thine *angle*, we'll to the river there.
My Musick playing far off, I will betray
Tawny finn'd fish; my bending hook shall
pierce

Their slimy jaws. *Shakespeare.*

The patient fisher takes his silent stand,
Intent his *angle* trembling in his hand;
With looks unmov'd, he hopes the scaly breed,
And eyes the dancing cork, and bending reed.

Pope.

(3.) ANGLE is otherwise defined the inclination of two lines meeting one another in a point. See GEOMETRY.

(4.) ANGLE, in geography, a town of France, in the department of Vienne, seated on the Anglin, 22 miles from Poitiers.

ANGLE, ACUTE, CURVILINEAL, RECTILINEAL, &c. See GEOMETRY.

ANGLE OF DIRECTION, ELEVATION, &c. See MECHANICS.

ANGLE OF INCIDENCE, in optics, the angle which a ray of light makes with a perpendicular to that point of the surface of any medium on which it falls; though it is sometimes understood of the angle which it makes with the surface itself.

ANGLE OF LONGITUDE, in astrology, the angle which the circle of a star's longitude makes with the meridian at the pole of the ecliptic.

ANGLE OF PARALLAX, in astronomy, the angle made by two lines supposed to be drawn from the centre of a planet to the surface of the earth.

ANGLE OF REFRACTION now generally means the angle which a ray of light, refracted by any medium, makes with a perpendicular to that point of the surface on which it was incident; but has sometimes been understood of the angle which it makes with the surface of the refracting medium itself.

ANGLE OF THE TENAILLE, POLYGON, &c. See FORTIFICATION.

* To ANGLE. *v. n.* [from the noun.] 1. To fish with a rod and hook.

The ladies *angling* in the crystal lake,
Feast on the waters with the prey they take.

H. li.

2. To try to gain by some insinuating artifices, fishes are caught by a bait.—If he spake courtously, he *angled* the people's hearts: if he was silent, he mused upon some dangerous plot. *Shakespeare.*

By this face,
This seeming brow of justice, did he win
The hearts of all that he did *angle* for.

Shakespeare.

The pleasant'st *angling* is to see the fish
Cut with her golden oars the silver stream,
And greedily devour the treacherous bait;
So *angle* we for Beatrice.

Shakespeare.

* ANGLE ROD. *n. f.* [*angle roede*, Dutch.] The stick to which the line and hook are hung.—differeth much in greatness; the smallest being used for thatching of houses; the second bigness used for *angle-rods*; and in China, for beating offenders upon the thighs. *Bacon.* He makes May-fly to a miracle, and furnishes the whole country with *angle-rods*. *Addison.*

* (1.) ANGLER. *n. f.* [from *angle*.] He that fishes with an *angle*.

He, like a patient *angler*, ere he strook,
Would let them play a while upon the hook.

Dryden.

Neither do birds alone, but many sorts of fish feed upon insects; as is well known to *anglers*, who bait their hooks with them. *Ray.*

(2.) ANGLER, in ichthyology, the English name of a species of lophus. See LOPHUS.

(1.) ANGLES, an ancient German nation, originally a branch of the Suevi; who, after various migrations, settled in that part of Denmark, and duchy of Sleswick, which to this day is called *Angel*, and of which the city of Flensbourg is the capital. Here they were known, even in the time of Tacitus, by the name of *Angli*. The origin of this name is variously accounted for. According to Saxo-Grammaticus, they were called *Angli* from one Angulus, son to Humblus, king of Denmark. Widschind, a Saxon writer, would have them to be called *Angli*, from an island at the corner or angle of the sea, which they conquered. Goropius derives their name from the Saxon word *Angel*, or *Engel*, signifying a fish-hook. The Angles, like the other Saxon nations, being greatly addicted to piracy, and on that account being so named by the neighbouring nations; as if like hooks, they caught all that was in the sea. To this nation the British ambassadors are said to have applied when soliciting succours against the Scots and Picts. The Angles therefore came over in greater numbers than any other Saxon nation; and accordingly had the honour of giving the name of *Anglia* to England. See ENGLAND.

(2.) ANGLES, a town of France, in the department of Tern. near Castres, seated on a mountain near the river Agout.

(3.) ANGLES, in astrology, denote certain houses of a figure, or scheme of the heavens. Thus the horoscope of the house is termed the angle of the east.

ANGLESBOROUGH, a small town of Ireland, Limerick.

ANGLESEY, Isle of, the most western of North Wales. It is 24 miles in length and breadth, and about 230 from London. It is separated from Caernarvonshire by a strait called the Menai, and on every other side is surrounded by the sea. It is a fertile spot, and abounds in cattle, flesh, fish, and fowls.

ANGLESEY, ANCIENT ACCOUNTS OF. In ancient times this island was called *Mon*, *Mona*, or *Ynys*. It was the great nursery of the religion of the Druids; being the residence of the Grand Druid, or chief pontiff, and consequently of all the learned doctors in that religion. Many ancient monuments of Druidism still remain in the island. At Tre'r Dryw, or the habitation of the great druid, are several mutilated remains, which have been described by Mr Rowlands. His *Bryn Cerrig*, or *Bryn Cerryn*, or royal tribunal, is a circular hollow of 180 feet in diameter, surrounded by a massive agger of earth and stones, evidently brought from some other place, there not being any mark of their being taken from the spot. It has only a single entrance. This is supposed to have been the grand consistory of the druidical constitution.—Not far from it was one of the *cellars*, now in a manner dispersed, but which consisted of a great copped heap of stones, in which sat aloft a druid, instructing the surrounding people *multa de Deorum immortalium vi et potestate disputare, et juventuti tradunt*; Cæf. l. 6.—Here were also the relics of a circle of stones, with the *cromlech* in the midst; but all extremely imperfect. Two of the stones are very large; one, which serves at present as part of the wall of a house, is 12 feet 7 inches high and 8 feet 6 inches wide; and another 11 feet high and 23 feet in diameter. Some lesser stones yet remain. This circle, if complete, was one of the temples of the Druids, in which their religious rites were performed. It is the conjecture of Mr Rowlands, that the whole of these remains were surrounded by a circle of oaks, and formed a deep and square enclosure. Near this is *Caer Leb*, or the moated enclosure; of a square form, with a double ditch, and broad ditch intervening, and a lesser ditch on the outside. Within are foundations of round and of square buildings. This Mr Rowlands supposes to have been the residence of the chief druid, and to have given the name, *Tre'r Dryw*, to the township in which it stands. At Tre'r Wry are several faint traces of circles of stones, and other vestiges of buildings; but all so decayed, or hid in weeds, as to become almost unrecognizable. *Bod-drudan* or the habitation of the druids, *Tre'r-Beirdd* or that of the bard, and *Tre'r-Preby* or that of the priests, are all of them situated, nearly surrounding the seat of the chief druid, composing the essential part of his suite. At the last is a thick *cromlech*, resting on three stones. The shore near Porthamel, not far from the town, is famed for being the place where Suetonius landed, and put an end in this island to the reign of Caractacus. His infantry passed over in flat-bottomed boats, perhaps at the spot still called *Pant yr Eiddig*, or the valley of *Skiffs*. His cavalry crossed partly by fording, partly by swimming.

Of the conflict on this occasion, we have an animated description by Tacitus; of which, for brevity's sake, we shall only give the translation: On the shore stood a motley army in close array, and well armed; with women running wildly about in black attire with dishevelled hair, and like the furies brandishing their torches; surrounded by the druids, lifting up their hands to heaven, and pouring forth the most dreadful imprecations. The soldier stood astonished with the novelty of the sight. His limbs grew torpid, and his body remaining motionless resigned to every wound. At length, animated by their leader, and rousing one another not to be intimidated with a womanly and fanatic band, they displayed their ensigns, overthrew all who opposed them, and flung them into their own fires. After the battle, they placed garrisons in the towns, and cut down the groves consecrated to the most horrible superstitions: for the Britons held it right to sacrifice on their altars with the blood of their captives, and to consult the gods by the inspection of human entrails."—There are no traces of any Roman works left in this country. Their stay was so short, that they had not time to form any thing permanent.

(3.) ANGLESEY, ANCIENT BUILDINGS IN. At a small distance from Beaumaris, on the shore, stand the remains of Llanvaes, or the Friars. It was founded by Prince Llewellyn ap Jerwerth, and, according to the general tradition of the country, over the grave of his wife Joan, daughter of King John, who died in 1237, and was interred on the spot. Here also were interred a son of a Danish king, Lord Clifford, and many barons and knights who fell in the Welsh wars. It was dedicated to St Francis, and consecrated by Howel bishop of Bangor, a prelate who died in 1240. The religious were Franciscans, or minor friars. Their church and house were destroyed, and their lands wasted, in the insurrection made soon after the death of Llewellyn, the last Welch prince, by his relation Madoc. Edward II. in consideration of their misfortunes, remitted to them the payment of the taxes due to him, which before the war were levied at the rate of L. 12. 10 s. These friars were strong favourers of Glendower. Henry, in his first march against Owen, plundered the convent, put several of the friars to the sword, and carried away the rest; but afterwards set them at liberty, made restitution to the place, but peopled it with English recluses. It possibly was again reduced to ruin; for Henry V. by patent, establishes here eight friars, but directs that two only should be Welsh. At the dissolution, Henry VIII. sold the convent and its possessions to one of his courtiers. They became in later days the property of a family of the name of *White* now extinct, who built here a good mansion. It became of late, by purchase, the property of Lord Bulkeley. The church is turned into a barn, and the coffin of the princess Joan now serves for a watering trough.—A little farther is Castell Aber Llienawg, a small square fort, with the remains of a little round tower at each corner. In the middle one stood a square tower. A foss surrounds the whole. A hollow way is carried quite to the shore, and at its extremity is a large

a large mound of earth, designed to cover the landing. This castle was founded by Hugh Lupus Earl of Chester, and Hugh the Red Earl of Shrewsbury, in 1098, where they made an invasion, and committed more savage barbarities on the poor natives, especially on one Kenred a priest, than ever stained the annals of any country. Providence sent Magnus king of Norway to revenge these cruelties. His coming was to all appearance casual. He offered to land, but was opposed by the earls. Magnus stood in the prow of his ship, and calling to him a most expert bowman, they at once directed their arrows at the Earl of Shrewsbury, who stood fully armed on the shore. An arrow pierced his brain through one of his eyes, the only defenceless part. The victor, seeing him spring up in the agonies of death, insultingly cried out, in his own language, *Leit loupe*, "Let him dance." This fort was garrisoned so lately as the time of Charles I. when it was kept for the parliament by Sir Thomas Cheadle; but was taken by Colonel Robinson in 1645. Above Llanddona is a high hill, called *Bwrdd Arthur*, or Arthur's round table: the true name was probably *Din*, or *Dinas Sulwy*; for a church immediately beneath bears that of *Llanvibangle Din-Sulwy*. On the top of it is a great British post, surrounded by a double row of rude stones with the sharp points uppermost; and in some parts the ramparts are formed of small stones. In the area are vestiges of oval buildings: the largest is formed with two rows of flat stones set on end. These had been the temporary habitations of the possessors. It had been a place of vast strength; for, besides the artificial defence, the hill slopes steeply on all sides, and the brink next to the ramparts are mostly precipitous. It is worth while to ascend this hill for the sake of the vast prospect; an intermixture of sea, rock, and alps, most savagely great. About two miles south of Plas Gwyn, the seat of Paul Panton, Esq; was situated Penmynydd, once the residence of the ancestors of Owen Tudor, second husband to Catherine of France, queen dowager of Henry V. a marriage which restored the British race of princes to this kingdom: the mixed race having ceased on the accession of Henry VII. grandson to Owen Tudor, the lineal descendant of Cadwalader, the last king of the Britons. The remains of the residence of the Tudors are, the door of the gateway: part of the house, and the great chimney piece of the hall, are to be seen in the present farm house. Some coats of arms, and dates of the building or time of repairs, are to be seen, with the initial letters of the names of the owners. The Tudors, for a considerable space before the extinction of their race, assumed the name of *Owen*. Richard was the last male of the family, and was sheriff of the county in 1657. Margaret, heiress of the house, married Coningsby Williams, Esq; of Glan y gors, in this island, who possessed it during his life. It was afterwards sold to Lord Bulkeley, in whose descendant it still continues. In the church of Penmynydd is a most magnificent monument of white alabaster, removed at the dissolution from the abbey of Llanvaes to this place; probably erected in memory of one of the house of Tudor, who

had been interred there. On it is the figure of a man in complete armour, a conic helm, and mail guard down to his breast; his lady is in a thick angular hood; their feet rest on lions, and their heads are supported by angels. On the western point of the bay is a small cape, flat top, called *Castell-mawr*, joined to the land by a low isthmus. It is composed of lime stone, which is carried to distant parts in small vessels, which lie in a small channel near the rock, and by the numbers frequently enliven the view. Roman coins have been found in this neighbourhood; but there are no vestiges of there having been a station.

(4.) ANGLESEY, CATTLE AND PRODUCE OF. At Port Aethwy, the most general ferry into the island, there is a great passage of cattle. It is computed that the island sends forth annually from 12,000 to 15,000 heads, and multitudes of sheep and hogs. It is also computed that the remaining stock of cattle is 30,000. In 1773 upwards of 90,000 bushels of corn were exported exclusive of wheat. The improvement in husbandry has greatly increased since the suppression of smuggling from the Isle of Man: before that time every farmer was mounted on some high promontory, expecting the vessel with illicit trade; but since that period, he sets in earnest to industry and cultivation. Not but that the island was in most remote time famous for its fertility: *Mam Gymry*, the Nursing mother of Wales, was a title it assumed even in the 12th century.

(5.) ANGLESEY, COPPER MINES OF. At Tryclwyn mountain is the most considerable body of copper ore perhaps ever known. The part of Tryclwyn which contains it is called *Parys mountain*. Of this mountain, and the works there carried on, we have the following very curious and particular account by Mr Pennant:—"The external aspect of the hill is extremely rude, and rises into enormous rocks of coarse white quartz. The ore is lodged in a basin, or hollow, and has on one side a small lake, on whose waters, distasteful as those of Avernus, no bird is known to alight. The whole aspect of this tract has, from the mineral operations, assumed a most savage appearance. Suffocating fumes of the burning heaps of copper arise in all parts, and extend their baneful influence for miles around. In the adjacent parts vegetation is nearly destroyed; even the mosses and lichens of the rocks have perished; and nothing seems capable of resisting the fumes but the purple melic grass, which flourishes in abundance. It is thought that the ore has been worked in a very distant period. Vestiges of the ancient operations appear in several parts, carried on by trenching, and by heating the rock intensely, then suddenly pouring on water, to cause them to crack or scale; thus answering the use of gunpowder. Pieces of charcoal were also found, which proves that wood was made use of for that purpose. As the Britons imported all works in brass, it is certain that the Romans were the undertakers of these mines, and it is very probable that they sent the ore to Caerhên to be smelted, the place where the famous cake of copper was discovered. They might likewise have had a smelting-hearth in the island."

found; for a round cake of copper was discovered at Llanvaethlle, a few miles from this place. Its weight was fifty pounds, and it had on it a mark resembling an L. "In 1762, one Alexander Fraser came into Anglesey in search of mines. He visited Parys mountain; called on Sir Nicholas Bayley, and gave him so flattering an account of the prospect, as induced him to make a trial, and sink shafts. Ore was discovered; but before any quantity could be gotten, the mines were over-run with water. In about two years after, Messrs Roe and Co. of Macclesfield applied to Sir Nicholas for a lease of Penryn ddu mine in Gwyneddshire; with which they were, much against their wills, compelled to take a lease of part of this mountain, and to carry on a level, and make a fair trial. The trial was accordingly made; ore was discovered; but the expences over-balanced the profits. They continued working for a great loss; and at length determined to drop the affair up. They gave their agent orders for that purpose; but he, as a final attempt, directed his men into ten several companies, of three or four in a partnership, and let them sink shafts in various places, about 800 yards eastward of a place called the *Golden Venture*, on a presumption that a spring, which issued from near the place, must come from a body of mineral. His conjecture was right; for in less than two days they met with, at the depth of seven feet from the surface, the solid mineral, which proved to be the vast body which has since been worked to such advantage. The day that this discovery was made was March 2d, 1768; which has ever since been observed as a festival by the miners. Soon after this discovery, another adventure was begun by the reverend Mr Edward Hughes, owner of part of the mountain, in right of his wife Mary Lewis of Llys Dulas; so that the whole of the mountain is the property of Sir Nicholas Bayley and himself. The body of copper ore is of unknown extent. The thickness has been ascertained in some places by the driving of a level under it, several years ago, and it was found to be in some places twenty-four yards. The ore is mostly of the kind called by Cronstedt *Pyrites cupri flavo-virescentis*, and contains vast quantities of sulphur. It varies in degrees of goodness; some of it is rich, but the greater part poor in quality. There are other species of copper ore found here. Of late a vein of the *Pyrites cupri griseus* of Cronstedt, about seven yards wide, has been discovered near the west end of the mountain: some is of a grey, some quite black; the first contains about 10 lb. of copper per cbl. the last forty. An ore has been lately found, in form of loose earth, of a dark purplish colour; and the best of it has produced better than eight in twenty. Some years ago, above 30 lb. of native copper was found in driving a level through a turbery; some was in form of moss, some in very thin leaves. It is carried out of the bed in vast masses; is broken into small pieces; and the most pure part is sold at the rate of about 3*l.* to 6*l.* per ton, or sent to the smelting-houses of the respective companies to be melted into metal. Mr Hughes has four furnaces of his own at Ravenhead, near Liverpool, and at Swansey, in South Wales. An

idea of the wealth of these mines may be formed, by considering that the Macclesfield company have had at once 14,000 tons of ore upon bank, and Mr Hughes 30,000.

(6.) ANGLESEY COPPER MINES, MANNER OF WORKING. "The impure ore is broken to about the size of hens eggs; but to clear it from the quantity of sulphur with which it abounds, as well as other adventitious matter, it must undergo the operation of burning. For that purpose it is placed between two parallel walls of vast length: some kilns are 20, others 40, and 50 yards in length; some 10, others 20, feet wide, and above 4 feet in height. The space between is not only filled, but the ore is piled many feet higher, in a convex form, from end to end. The whole is then covered with flat stones, closely luted with clay; and above is placed a general integument of clay, and small rubbish of the work, in order to prevent any of the fumes from evaporating. Of late, some kilns have been constructed with brick arches over the ore, which is found to be the best method of burning. Within these few years, attempts have been made to preserve the sulphur from flying away; and that is done by flues made of brick, whose tops are in form of a Gothic arch, many scores of feet in length. One end of these opens into the beds of copper which are to be burnt. Those beds are set on fire by a very small quantity of coal, for all the rest is effected by its own phlogiston. The volatile part is confined, and directed to the flues; in its course the sulphureous particles strike against their roofs, and fall to the bottom in the form of the finest brimstone; which is collected and carried to adjacent houses, where it is melted into what is called in the shops *stone brimstone*. The beds of copper, thus piled for burning, are of vast extent. Some contain 400 tons of ore, others 2000. The first require four months to be completely burnt, the last near ten. Thus burnt, it is carried to proper places to be dressed, or washed, and made merchantable. By this process the ore is reduced to a fourth part in quantity, but considerably improved in quality: and by this means the water is strongly or richly impregnated with copper, which is dissolved by the acid quality of the sulphur; and is collected or precipitated again by iron in the above-described pits. The iron is all dissolved. But a far richer produce of copper is recovered from the water lodged in the bottom of the bed of ore, which is highly saturated with the precious metal. This is drawn up, either by means of whimsies or wind mills, to the surface, and then distributed into numbers of rectangular pits 36 feet long, some pits more some less, 12 to 15 feet broad and 20 inches deep. To speak in the language of the adepts, *Venus* must make an assignation with *Mars*, or this solution will have no effect. In plain English, a quantity of iron must be immersed in the water. The kind of iron is of no moment; old pots, hoops, anchors, or any refuse will suffice; but of late, for the convenience of management, the adventurers procure new plates, four feet long, one and a half broad, and three quarters of an inch thick. These they immerse into the pits. The particles of copper instantly are precipitated by the iron, and the iron

is gradually dissolved into a yellow ocher. Great part of it floats off by the water, and sinks to the bottom. The plates, or the old iron (as it happens), are frequently taken out, and the copper scraped off; and this is repeated till the whole of the iron is consumed. The copper thus procured differs little from native copper, and is prized accordingly, and sold for prices of £ 25. to £ 45. a ton. This discovery is far from new: it has been practised long in the Wicklow mines in Ireland; and above a century in those of Hern-grundt in Hungary, where it is called *zinent copper*. The waters of the Hungarian mines are much more strongly impregnated with copper than those of Parys mountain. The first effects its operation in 12 or about 20 days, the last requires 2 months. Horse shoes, iron made in shape of hearts, and other forms, are put into the foreign waters; and when perfectly transmuted, are given as presents to curious strangers. The ore is not got in the common manner of mining, but is cut out of the bed in the same manner as stone is out of a quarry. A hollow is now formed in the solid ore open to the day, and extends about 100 yards in length, about 40 yards in breadth, and 24 yards in depth. The ends are at present undermined, but supported by vast pillars and magnificent arches, all metallic; and these caverns meander far underground. These will soon disappear, and thousands of tons of ore be gotten from both the columns and roofs. The sides of this vast hollow are mostly perpendicular, and access to the bottom is only to be had by small steps cut in the ore; and the curious visitor must trust to them and a rope, till he reaches some ladders, which will conduct him the rest of the descent. On the edges of the chasms are wooden platforms, which project far; on them are windlasses, by which the workmen are lowered to transact their business on the face of the precipice. There suspended, they work in mid air, pick a small space for a footing, cut out the ore in vast masses, and tumble it to the bottom with great noise. In such situations they form caverns, and there appear safely lodged till the rope is lowered to convey them up again. Much of the ore is blasted with gun powder, eight tons of which are said to be annually used for the purpose.

(7.) **ANGLESEY, LEAD MINES AND OTHER MINERALS IN.** "Nature hath been profuse in bestowing her mineral favours on this spot: for above the copper ore, and not more than three quarters of a yard beneath the common soil, is a bed of yellowish greasy clay, from one to four yards thick, containing lead ore, and yielding from 600 to 1000 pounds weight of lead from one ton; and one ton of the metal yields not less than 57 ounces of silver. Mixed with the earth, are frequently certain parts of the colour of cinnabar. Whether these are symptomatic of the sulphureous arsenical silver ores or of quicksilver, I will not pretend to decide. Something interferes with the successful smelting of this earth in the grate; inasmuch that it has not yet been of that profit to the adventurers which might reasonably be expected from the crucible assays of it, and they have at this time about 8000 tons on bank undisposed of. This place has been worked for lead

ore in very distant times. In the bottom of the pool was found an ancient smelting hearth of green stone, and several bits of smelted lead, of about four inches in length, two in breadth, and half an inch thick. These works have added greatly to the population of the island; for about 1500 persons are employed; who, with their families, are supposed to make near 8000 persons, getting their bread from these mines. The little village of Amlwch, the port of the place, is increasing fast, and the market grows considerable. At the season of the greatest work, Mr Hughes's men alone receive for many weeks £ 200. in one week and £ 150. in another, merely for subsistence. The port is no more than a great chasm between two rocks, running far into land, and dry at low water; into which sloops run, and lie secure to receive their lading."—Near Kemlyn Bay is a quarry of marble, common to this place, for parts of Italy, and to Corsica, and known in the shops by the name of *Verde di Corsica*. Its colours are green, black, white, and dull purple, irregularly disposed. In different blocks one or other of the colours are frequently wanting; but among the green parts are often found narrow veins of most elegant and silky white asbestos. It is a compound species of marble: part is calcareous and may be acted on by aquafortis. The green parts partake of the nature of jasper. It is apt to be intersected by small cracks, or by asbestos veins, therefore incapable of taking a high polish. This quarry lies on the lands of Monachty, the parish of Llan-Fair-Ynghornwy; and it is found again in the isle of Skerries, off this parish. Neither the quarry nor the asbestos are at present in use. In Rhoscolyn parish, a green amiantine or brittle asbestos, is met with in great plenty. A green marble similar to the above; but by reason of the inflexible quality of its fibres not applicable to the same use. Beyond Castle-mawr, on the shore, are vast blocks of black-marble, filled with shells, coralloids and fungitæ.

(8.) **ANGLESEY, POPULATION, &c. OF.** The island is divided into 74 parishes, of which most of the churches are situated near the shores. From an account given on the 13th of August 1566 there were 2040 households, or families, in Anglesey; allowing five to a family, the whole number of inhabitants in that period was 10,050. In 1776, the number of houses in Anglesey was about 3,956; allowing five persons to a family, the whole number of inhabitants was at that time 19,780; which wants only 340 of doubling the number of inhabitants in the intervening space. The chief town is BEAUMARIS.

(9.) **ANGLESEY, WOODS, &c. IN.** Near the ferry of Moel y Don appear the fine woods of Sir Nicholas Bayley, skirting the Menai for a considerable way. The wooded part of the island on this side. It commences at Llanidan, and is called the ancient British name of Anglesey, *Yr Dywyll*, or the *Dark Island*, on account of the deep shade of its groves: but at present, except in this part, the island is entirely divested of trees, and the climate so averse to their growth, that in most parts it is with great difficulty the gentlemen can raise a plantation round their houses. P. Newydd, the seat of Sir Nicholas Bayley, is

upon the water, protected on three sides by variable oaks and ashes. The view up and down this magnificent river-like strait is extremely fine. The shores are rocky; those on the opposite side covered with woods; and beyond a long range of Snowdonian alps. Here stood a hall built by Gwenllian, a descendant of Cadwallodd. The mansion has been improved, and altered to a castellated form by the present owner. In these woods are some very remarkable druidical remains. Behind the house are to be seen two vast cromlechs. The upper stone of each is 12 feet 7 inches long, 12 broad, and four feet high, supported by five tall stones. The other is barely separated from the first: is almost a square, of five feet and a half, and supported by four stones. The number of supporters to cromlechs are merely accidental, and depend on the form of the incumbent stone. These are the most magnificent we have, and the highest from the ground; for a middle-sized horse may creep under the largest. In the lands of Llanidloes, indeed, there is a most stupendous one of a semicircular form. The greatest diagonal is 15 feet, the lesser 15, and the thickness 3 feet 6 inches; but its height from the ground is only 12 feet: it was supported by several stones. The Welsh, who ascribe every thing stupendous to a famous British king, call it *Arthur's Quoit*. In the woods at this place are some druidical circles nearly contiguous to each other.

ANGLESEY ABBEY, a small town in Cambridgeshire, near Botolph.

ANGLETON, a village in Sussex, near Lewes.

ANGMERING, E. and W. two small villages in the county of Sussex, on the English Channel, 20 miles apart. They have a weekly market on Monday, and a fair July 30.

ANGLI. See ANGLES, No. 1.

ANGLIA. See ENGLAND.

ANGUCANÆ GUTTÆ. See GUTTÆ.

ANGUCANUS SUDOR, the sweating sickness.

ANGLICISM. *n. s.* [from *Anglus*, Lat.] A manner of speech peculiar to the English language; an English idiom.

They corrupt their stile with untutored *Anglicism*. *Milton.*

ANGLIN, a river of France, in the department of Vienne.

ANGLING, among sportsmen, the art of fishing with a rod, to which are fitted a line, hook, and bait.

See FISHING-ROD, FISHING-HOOK, FISHING-BAIT.

The angler's first business is to attract fish to the place intended for angling. The method of doing this, in standing waters, by throwing in grains, chopped worms, and the like, is well known: but the chief difficulty is in running rivers and brooks. The method, in this case, is to prepare a tin box capable of holding some hundred of worms, bored on all sides, and full of holes of such a size as they may be just able to crawl out at; there must be a plummet fastened to this box to sink it, and a line to draw it back to pleasure; in this case it is to be thrown into the water in a proper place, above which the angler may stand under cover. The worms will slowly and gradually crawl out of this box, and the fish will be gathered about to feed on them; the

baited hook is to be thrown in higher up and carried down by the stream. If this method do not bring the fish about the place in a little time, there is reason to suspect that some pike lies lurking thereabout, and deters them: in this case, it is proper to throw out a baited hook, and he will generally be taken; after this the attempt will succeed. When the angler takes his stand, he is to shelter himself, under some trees or bush, or stand so far from the brink of the water that he can only discern his float; as fish are timorous and easily frightened away. The angling rod must be kept in a moderate state, neither too dry nor too moist: in the first case, it will be brittle; in the other, rotten. When pastes are used, it is proper to mix a little tow with them, and rub them over with honey; finally, a small anointing with butter is of great use to keep them from washing off the hook. The eyes of any fish that is taken are an excellent bait for almost any other kind of fish. The best way of angling with the fly is down the river and not up; neither need the angler ever make above half a dozen of trials in one place, either with fly or ground bait, when he angles for trout: by that time the fish will either offer to take, or refuse the bait and not stir at all. In a pond, the best place for the angler to take his stand is usually that where the cattle go up into water: in rivers, if breams are fished for, it should be in the deepest and most quiet places; if eels, under the banks of rivers, that hang over; perch are to be expected in clean places, where the stream is swift; the chub in deep shaded holes: roach are most found where the perch are, and trout only in swift and clear streams. Places where there are many weeds, or old stumps of trees, harbour fish in great numbers, and they usually bite freely there; but there is danger of entangling the line, or fastening the hook to the weeds. In case of this accident, recourse is to be had to a ring of lead, of about six inches round, fastened to a small pack thread: this ring is to be thrust over the rod, and let fall into the water, at the place where the hook is entangled; and then, by pulling the pack-thread gently, the hook will be soon disengaged, or at the worst it can only be broke off near the end of the line; whereas, when this is not employed, the rod itself is sometimes broken, or the line nearer its upper end. Deep waters are best for angling in, for the fish do not love to be disturbed by wind and weather. The openings of sluices and mill-dams always bring fish up the current to seek for the food which is brought with the stream; and angling in these places is usually successful. The best season is from April to October; for, in very cold stormy weather, the fish will not bite: the best times of the day are from three till nine in the morning, and from three in the afternoon till sun-set. In an easterly wind, there is never much sport for the angler; the southerly winds are the best for his purpose, and a warm but lowering day is most of all to be chosen; a gentle wind, after a sudden shower, to disturb the water, makes a very good opportunity for the angler; the cooler the weather in the hottest months, the better, but in winter, on the contrary, the warmer the day the better. A cloudy day, after a bright moon-light night, is always a

good day for sport; for the fish do not care for going after prey in the bright moon shine, and are therefore hungry the next morning. Those who are fond of angling might save themselves some fruitless trouble, by observing when small fish in a jar take or refuse food. See FISH. The several methods of angling for salmon, trout, carp, tench, perch, pike, dace, gudgeons, roach, flounder, &c. may be seen under the article FISHING.

ANGLO-CALVINISTS, a name given to the members of the church of England, because their doctrinal articles are built on the system of Calvin; though some modern writers alledge, that the doctrinal system of the English church is Arminian. The Anglo-Calvinists make one of the four branches or divisions of Calvinists; and stand distinguished from the pure Calvinists, the Piscatorians, and the Arminians.

ANGLO-SAXON, an appellation given to the language spoken by English Saxons; in contradistinction from true Saxon, as well as modern English.

ANGLUS, Thomas, an English priest, well known for the singularity of his opinions, and several little tracts which he wrote in the 17th century. He went by several names. Mr Baillet says his true name was *White*; but that he used to disguise it under that of *Candidus*, *Albus*, *Bianchi*, and *Richworth*. He was most known in France by the name of *Thomas Anglus*. Des Cartes generally called him *Mr Vitus*. He passed some time in most countries of Europe; but his longest stay was at Rome and Paris. When he was in England, he lived a considerable time in the family of Sir Kenelm Digby; for whose opinions he had a great esteem, as may be seen in his preface to his Latin work concerning the Institutions of the Peripatetic Philosophy; for which he was a great advocate. He attempted even to make the principles of Aristotle subservient to explain the most impenetrable mysteries of religion, such as, predestination, free-will, grace, &c. Mr Baillet says, "What he wrote upon this subject resembles the ancient oracles for obscurity." In such abstruse points, he was much embarrassed; and, by giving too great scope to his own thoughts, he pleased neither the Molinists nor Jansenists. He is allowed, however, to have been a man of an extensive and penetrating genius. On the 10th of June 1658, the congregation of the Index Expurgatorius at Rome condemned some of his treatises. The doctors of Douay censured also 22 propositions extracted from his Sacred Institutions. He published his *Supplicatio postulativa justitiæ*, in opposition to their censure; wherein he complains, that they had given him a vague undetermined censure, without taxing any particular proposition. He died some time after the restoration of Charles II.

* **ANGOBER. n. f.** A kind of pear.

ANGOL, a pleasant and well watered city of S. America, in the province of Chili, 125 N. of Baldivia. Long. 78. 30. W. Lat. 38. 10. N.

(1.) **ANGOLA**, BOUNDARIES, CLIMATE, &c. OF. Angola is a kingdom on the western coast of Africa, lying, according to the most probable accounts, between Lat. 5. 0. and between 16. 21. S. — having a coast of upwards of 480 miles, Long. 15°. E. Angola Proper is bounded on

the North by the river Danda, which separates from Congo; and on the South by the Coanza by which it is separated from Benguela. The last, however, is now included in the kingdom Angola, having been conquered by its monarch though it still retains the name of kingdom, and is included in the dimensions we have just now given. The air here is very hot and unwholesome, and the country mountainous; there being but few plains to be met with in it, except on the sea coast, and between the huge ridges of mountains.

(2.) **ANGOLA, EARLIEST ACCOUNTS OF.** The part of the kingdom which we have distinguished by the name of *Angola Proper*, was subject to the kings of Congo in the year 1484, when the Portuguese first discovered the country: but how long it had been so before that time, is not known, the inhabitants being utterly ignorant of chronology, and having no other way of distinguishing past events but by saying they happened in such king's reign. Neither, though Angola became a distinct kingdom since its discovery by the Portuguese, is it known with more certainty at what time that revolution happened; or whether the Portuguese were not concerned in assisting the viceroy of the king of Congo, who governed the province of Angola, to set up for himself. All accounts agree, that this kingdom was founded by one *Ngola*, or *Angola*, from whom it took its name. According to the tradition of the country, this *Ngola* was a smith, and the inventor of that trade, in which he had been instructed to drive the demons of the country. In consequence of this, he became exceeding rich, not in gold, silver, or shell-money, which were not at that time in use; but in corn, cattle, and fruits, which were then exchanged in traffic. The country being long after visited by a grievous famine, *Ngola* generously relieved his distressed countrymen, and saved the lives of some thousands. In gratitude of this generosity, he was unanimously chosen king; and hence the smith's trade is reckoned among the royal arts of Angola.

(3.) **ANGOLA, HISTORY OF.** According to other accounts, which can be more depended upon, *Ngola* was the king of Congo's viceroy who, having become powerful by the reduction of several of the neighbouring states, was induced to set up for himself. Dreading, nevertheless, the power of his old master, he chose to send him the usual tribute and presents annually, till he reckoned himself firmly seated on the throne, and had secured it to his descendents. His measures were greatly facilitated by the wars which the king of Congo was then engaged in with the *Agas*, a barbarous nation in the neighbourhood. These made such a powerful inroad into his dominions, that he was glad to ask assistance from *Ngola*; not as a subject, but as a friend and ally. This was readily granted; and the two monarchs continued ever after, sending presents and assistance to each other, and encouraging a mutual commerce between their subjects. *Ngola* lived to a great age, highly respected by his subjects and in alliance with the king of Congo and the Portuguese, whose numerous settlements on the coast, had made them become very powerful. —

According

bal Giagas to their assistance. These immediately poured in, like a band of hungry dogs, hastening to feed upon a carcase; and having defeated and devoured the forces of the tyrant, besieged him in an inaccessible mountain; where they resolved to reduce him by famine. Bandi Angola applied to the king of Congo for assistance. As it was the interest of that prince, to hinder the ravenous Giagas from entering into the Angolic dominions, whence they could easily pass into his own, he ordered a strong reinforcement of the Portuguese, of whom he entertained a great number at his court, to march to the assistance of the king of Angola. The command of the army was given to one of the most experienced Portuguese officers; who, depending more on the handful of Europeans he had under his command, than on the Congoeze, attacked the rebels, though greatly superior in number; and, having defeated them, restored the king of Angola to his throne. This essential service so endeared the Portuguese to Bandi Angola, that he took them into his service, and even into his council. Their general became a great favourite of the king, but much more so of his daughter, who conceived a violent passion for him. Unfortunately for them both, the amour was carried on with so little precaution on her part, that the king quickly discovered it; and immediately formed a resolution of exterminating the Portuguese all at once. Such violent measures, however, could not be concerted so privately but the princess got intelligence of it; and having apprised her lover, he immediately withdrew into Congo, taking with him as many of his countrymen as he could. The king of Congo expressed such strong resentment against Bandi Angola for his ingratitude, that the Portuguese general would have probably prevailed upon him to declare war against Angola, had he not been obliged to defend his own dominions against a neighbouring prince who then made an invasion. This afforded that general a fair pretence of asking leave to return home; promising to come with such reinforcements, as would enable the king of Congo to revenge himself for the affront put upon him by the Angolic monarch. His real intention, however, was, to give the king of Portugal an opportunity of seizing upon the kingdom of Angola.—On his return to Lisbon, the Portuguese general having laid his plan before the king, it was so well relished, that an armament was ordered to be fitted out, well furnished with every necessary for building fortresses, &c. and a sufficient number of men. The wind proving favourable all the way back, the Portuguese soon arrived safe at Loando San Paulo; whence the general dispatched a messenger to acquaint the king of Congo with his arrival, and to make him some rich presents. These were no sooner gone than the admiral sailed up the Coanza; and, landing without opposition in the kingdom of Angola, set about erecting a fortress in a convenient situation, which was completed in a few days.—The king being informed of the return of the Portuguese, and of their fortifying themselves on advantageous ground, gathered together a numerous army: but his forces, though upwards of 100,000 in number, were defeated by the Portuguese; vast numbers killed,

and many more carried into slavery. The admiral now ravaged the whole country with fire and sword, and making himself master of every advantageous spot of ground. The king, however, still the good luck to escape all the stratagems that were laid for him; and once more got safe to inaccessible fortresses.—All this time Bandi Angola had tyrannized in such a manner, that his subjects were become no less weary of his government than when they formerly revolted. Being now exasperated beyond measure at the calamitous war which he had been the occasion, they formed a design of putting an end to his life; and in order to draw him out of his retreat, where he wallowed in all manner of debauchery, they had recourse to the following stratagem: A deputation was sent, acquainting him with the revolt of one Culo Cabazzo; who, at the head of a numerous band, committed the most cruel ravages. He besought his majesty either to levy a sufficient number of troops, and march in person against him, or to allow them to arm themselves against him. The credulous king complied with this proposal; and granted them leave to raise what forces might be thought necessary. Four days after, notice was sent to the king, that his subjects had attacked the rebels, and had been repulsed with loss; but that, if his majesty would but descend to animate them with his presence, the sight of him would inspire them with such courage, that they would assuredly prove victorious. This had the desired effect; and the king set out a few days after, without any other precaution than his own guards, to head his army which was encamped on the banks of the Lucalla. He was no sooner appeared in view, than all the chief officers came out to meet him; and having, under pretence of paying their respects, gradually separated him from his guards, they fell upon him and dispatched him at once. Bandi Angola was succeeded by his son Ngola Bandi, whose mother had been a slave; and whose title to the crown was consequently disputable, according to the laws of the country. Of this the new king being well apprised, thought proper to begin his reign by murthering every person who opposed his election. He began with the *Tendula*, or commander of the king's rear-guard; who, by his office, is the chief of the electors, and the person who governs the kingdom during the interregnum. Him he ordered to be put to death, with all his family. They were followed by the principal officers of his father's court; all his concubines, together with their parents and near relations, whom he caused to be butchered; together with his half-brother, his father's son by a favourite concubine, and the son of an infant. He did not spare even the son of his sister Zingha Bandi, whom she had by one of her paramours. The interest of his sister had contributed greatly to raise this tyrant to the throne, and his ingratitude, with the murder of her son, so exasperated her, that she swore to be revenged on him in a similar manner.—The Portuguese were the next objects of his resentment. These he so much dreaded, that he resolved not to lay down his arms till he had exterminated them, or driven them totally out of his dominion. His rashness, however, cost him dear. Thousand

In order to drive the Portuguese out of her kingdom; that, to ingratiate herself with the Giagas, she renounced Christianity and adopted their barbarous and bloody system of idolatry: that, after waging a long and bloody war with the Portuguese for a period of no less than 28 years, with various success, the terror of her arms, notwithstanding repeated defeats, became so great, that the Portuguese were glad to propose terms of peace to her: that during these negotiations she showed herself as great in the cabinet, as in the field, and acted with the spirit of an independent princess; and that, although she voluntarily re-embraced Christianity of her own accord, and even at a time when there was a considerable risk of offending her Giagan troops and allies by doing it, yet she did not allow the priests to interwarp her temporal with her spiritual concerns, but preserved her independent spirit in her civil government, in spite of the influence of father Anthony himself. The terms of peace at last agreed upon between Zingha and the Portuguese viceroy were. 1. "That the river Lucalla should be the boundary between the dominions of the Portuguese and of Queen Zingha. 2. That neither side should thenceforth give any reception to the fugitive slaves of the other, but send them back without any delay, together with the prisoners which had been taken during the last war. 3. That the queen should remain wholly free and exempt from all tribute and homage whatever, provided she agreed to the other articles." These terms were at last signed by the queen and viceroy in the month of April 1657, and ratified by the king of Portugal in the month of November that same year. After this, she had a short and successful war with the Giagan chief, who disliked her alliance with the Portuguese, and whom she defeated and killed. During the last 3 years of her reign she endeavoured to propagate Christianity among her subjects, and for that purpose sent an embassy to the pope, to which she received a very favourable answer. She died in 1662, aged 80 and was succeeded by her sister Barbara. She was buried with extraordinary magnificence; and, out of regard to her, Barbara was twice inaugurated with the greatest pomp, and the most joyful acclamations. Barbara was a very zealous Christian, but wanted her sister's abilities, and had the misfortune of being in the decline of life, lame, and almost blind. Besides this, she had been married to a proud ill-natured husband, named Mona Zingha; who, though he owed her all his fortune and advancement, being himself no more than the son of a slave, used her with such cruelty, even in the late queen's life, that she was obliged to take refuge in the palace, from whence he had the influence immediately to fetch her. This so exasperated queen Zingha, that she had well nigh ordered him to be cut in pieces before her face; but pardoned him at the request of father Anthony, who probably knew he was privy to some religious secrets which he might, in a case of such emergency, have disclosed. On Barbara's accession to the throne, however, he not only redoubled his cruelty to her, in hopes of getting the management of affairs entirely into his own hands, but

and accusations against Anthony himself,

with a design to extirpate both him and his religion. He gave out, that the late queen had been poisoned by some favourite European dishes, which brother Ignatio used to regale her during her last illness; and attributed his wife's lameness and blindness to some sorceries or charms used at the convent against her. He had even persuaded, or rather forced, his queen to consent that some of the singhillos or priests should be brought to counter charm her distemper. Father Anthony, far from being intimidated at the accusation brought against him, repaired immediately to the palace; where he boldly reprimanded the queen for giving ear to these jugglers, threatening at the same time to leave her dominions, and to carry off with him all the crosses, and other utensils of religion, from which alone they could have any benefit. The queen returned a very submissive answer; and promised to deliver up the counter charms which she at that time had upon her, before sunset; which she accordingly did, and sent them to the convent by the hands of her secretary. This so exasperated her husband, and all the Giagan sect, that they resolved upon the destruction of all the priests and Europeans, and even the queen herself. This, however, was found improper to be attempted; and Mona Zingha was so much chagrined at his appointment, that he retired to his own estate, giving out, that he designed to meddle no more with state affairs; but, in reality, to concert measures for engrossing the sovereignty to himself, and to deprive his wife of her life and crown. To accomplish his purpose, he sent a messenger to her, desiring her to repair to his house, where he had something of importance to communicate; but she declining the invitation by the advice of father Anthony, he found himself disappointed, and begged leave to retire to a province, under his own government. He was again disappointed, and forbid to stir out of the province of Metamora. The queen was, however, guilty of an error long after, in sending Mona Zingha at the head of an army to quell a revolt on the frontiers. On his returning victorious, he thought himself strong enough to revive the ancient Giagan rites, and therefore ordered 100 slaves to be sacrificed to the manes of the deceased queen. Though the queen was immediately apprised of his intention, she dispatched a messenger expressly commanding him to desist; yet Mona, by distributing some presents, particularly some European wines, among the counsellors, effected his purpose with impunity. He did not forget to send some of the wine to father Anthony: but to prevent suspicion, presented him only with a small quantity, to be used, as he said, at the mass; adding, that if it proved agreeable, he would supply him with a larger quantity. The unsuspecting priest drank about two glasses of it; and in about a quarter of an hour was seized with violent convulsions in his bowels, and other symptoms of being poisoned. By proper assistance, however, he recovered; but he was so disabled by this dose, that he was obliged to abandon his mission. The queen's intimacies in the mean time daily increasing, Mona Zingha was delivered from all further opposition on her part, by her death, on the 24th of May.

formerly rich and fertile, but almost ruined by the Gallas, a wandering nation in the internal parts of Africa, who dispossessed the Abyssinian monarchs of all that was worth possessing.

ANGOULESME, a city of France, in the department of Charente, 20 miles W. of Limoges, 64 S. E. of Rochelle, and 250 S. by W. of Paris. It is seated on the top of a hill, surrounded with rocks, at the foot of which runs the Charente. The inhabitants are about 8000, and drive a considerable trade in paper, which is their chief manufacture. Long. 0. 14. E. Lat. 45. 39. N.

ANGOUMOIS, a ci-devant province of France, bounded on the N. by Poitou, on the E. by Limoulin and March, on the S. by Perigord, and on the W. by Saintonge. It is now included in the department of Charente. It is watered by the Touvre and Charente. The air is generally warmer than at Paris, though the country is hilly. The soil produces plenty of wheat, rye, oats, Spanish corn, saffron, grapes, and all sorts of fruits. It has several iron mines, which yield a very good sort of iron.

* ANGOUR. *n. f.* [*angor*, Lat.] Pain.—If the patient be surprized with a lipothymous *angour*, and great oppression about the stomach, expect no relief from cordials. *Harvey*.

(1.) ANGOURA, or ANCYRA, anciently ANCYRA, a town of Natolia, in Asiatic Turkey, remarkable for its remains of antiquity; such as inscriptions, pillars, ruins of temples, &c. It is at present one of the best cities in Anatolia; its streets are full of pillars and buildings of old marble, among which are some of porphyry and jasper. The greatest part of the pillars are smooth and cylindrical; some are channelled spirally; but the most singular are oval, with plate bands before and behind from the top to the bottom of the pedestal. The castle, which is as large as a small town, and well inhabited, both by Christians and Turks, has a triple inclosure, and is built of white marble, and stone resembling porphyry. Throughout the walls of the town, which are low, and those of the houses which are generally built of unburnt brick, but especially those of the towers, antique fragments of capitals, architraves, &c. are interpersed.

(2.) ANGOURA, POPULATION, PRODUCE, TRADE, &c. OF. Angoura is computed to have 100,000 inhabitants, 90,000 of whom are Turks; and about 1000 of these are Janisaries: Greeks, Armenians, &c. compose the remaining 10,000. The *basha* of Angoura has an income of about 30 purses. The Arminians have seven churches, besides a monastery; and the Greeks two. The country produces very good red wine, and excellent rice grows on the banks of some of the rivers. In this place, there is the finest breed of goats in the world; their hair or wool is a pure dazzling white, about 9 inches long, and almost as fine as silk; a great trade is carried on this article, and the finest stuffs, especially camblets, are made of it. All the inhabitants are employed in this manufacture. The exports of Angoura, to Holland, France, and Great Britain, are about 1600 camels load yearly. Angoura is situated 212 miles S. E. of Constantinople. Several large caravans

pass through this city to different places. Long. 32. 5. E. Lat. 39. 30. N. See ANCYRA.

(1.) ANGOY, BOUNDARIES, EXTENT, TOWNS, &c. OF. A kingdom of Loango in Africa, bounded on the N. by Cacongo, and on the S. by Congo; from the former of which it is separated by the Cabinda, and from the latter by the river Zaire. It is but of small extent; being only a vassal province of Cacongo, till the mani or prince who had married the daughter of a Portuguese was persuaded by his father-in-law to make himself independent. This he effected at a favourable juncture, the king of Loango having but lately before revolted from the king of Congo, and expelled the king of Cacongo from the new king Loango. The country is full of woods and thickets; and has no towns of any note, except one called Lemangoy, situated on the north banks of the Zaire, and not far from its mouth. Its chief port is the Cabinda, called also Kabenda, or Cubenda, situated on the mouth of a river of the same name about five leagues N. of Cape Palmerino, on the N. side of the Zaire's mouth. The bay is very commodious for trade, or wooding and watering along the shore. It is flat and marshy in some places, but ascends gradually about three miles inland, and then forms itself into a ridge of hills. On the ascent of these is situated a town that belonged to the father-in-law of the king abovementioned, where he constantly kept a stock of wood ready cut, to sell to foreign ships at an easy rate. From these wood piles, S. W. along the bay, lie scattered a number of fishermen's huts, on each of which a small fresh water river which falls into the bay, and thence all the water for ships is brought in casks to the mouth of the river, which is so shallow, that even at full flood it can only be entered by yawls carrying a cask or two. The town stands on the round point of the bay looking to the westward; and the English have a factory on the south west of the road.

(2.) ANGOY, CUSTOMS, RELIGION, &c. OF. THE NATIVES OF. The dress of the inhabitants is the same with that of the Congoese. They practice polygamy, and the best beloved wife hath the command of the rest; but is no less liable to be turned out, if she proves unfaithful. The ladies of the blood royal however have the privilege of choosing their husbands out of any, even of the meanest rank; and have even the power of life and death over them; as over their paramours, if any of them are caught tripping; but the husbands are by no means intitled to expect the same fidelity from their royal ladies. Women of a lower rank are obliged, when they receive a stranger, to admit them for a night or two into their embraces. This obliged the missionaries who travelled through this country, to give notice of their approach to any of their ladies, that none of the female sex might enter within their doors.—Their religion consists chiefly in a variety of superstitious customs; such as poisoning their public and domestic idols with the dust of a kind of red wood, on the first day of the moon, and paying a kind of worship to the planet. If, on that night, it happens to be clear and bright, they cry out, "Thus may I

angry, and I will speak: peradventure there shall be thirty found there. *Gen.* xviii. 30. 2. It seems properly to require, when the object of anger is mentioned, the particle *at* before a thing, and *with* before a person; but this is not always observed.—Your Coriolanus is not much missed, but with his friends; the Commonwealth doth stand, and so would do, were he *angry at* it. *Shakespeare*.—Now therefore be not grieved, nor *angry with* yourselves, that ye sold me hither: for God did send me before you to preserve life. *Gen.* xlv. 5.—I think it a vast pleasure, that whenever two people of merit regard one another, so many scoundrels envy and are *angry at* them. *Swift*. 3. Having the appearance of anger; having the effect of anger.—The north wind driveth away rain; so doth an *angry* countenance a backbiting tongue. *Prov.* xxv. 23. 4. In chirurgery, painful; inflamed; smarting.—This serum, being accompanied by the thinner parts of the blood, grows red and *angry*; and, wanting its due progress into the mass, first gathers into a hard swelling, and, in a few days, ripens into matter, and so dischargeth. *Wise man*.

ANGSANA, } in botany, names by which

ANGSAVA, } some authors have described the *draco arbor*, or *dragon's tree*; one of the trees said to afford the *sanguis draconis*, or dragon's blood of the shops. It is esteemed an astringent, and an excellent remedy in the aphthæ.

ANGSO, a castle of Upland, in Sweden.

ANGTON, a town in Suffex, near Arundel.

ANGUED. See *ANGUID*.

ANGUELLA, in ichthyology, a name given by some authors to the fish more usually called hespetus, and atherina, a small fish caught about the shores of the Mediterranean, and some other places, and esteemed a delicate tasted one.

ANGUELLES, in falconry, small worms thrown up by hawks.

ANGUID, or ANGUEB, a desert of Tremecen, inhabited by horres of wild Arabs, who live chiefly by plunder, and by forcing travellers to pay them a tax for what they call pass-ports, which are a kind of small flag at the end of a lance. As they raise little corn, dates, milk, wild fruits and game, are their principal fare. They ramble about the country, and pay no tribute to the Algerines, as they acknowledge no chief but their own.

ANGUIFER, or ANGUITENENS, in astronomy, a cluster of stars, resembling a man holding a serpent.

ANGUIGENOUS, engendered of serpents.

ANGUILLA, the most northerly of the Caribbee islands, it has its name from its snake like form; and is about ten leagues in length, and three in breadth. It was first discovered by the English in 1650, when it was filled with alligators and other noxious animals; but finding the soil fruitful, and proper for raising tobacco and corn, they settled a colony on it, and imported live cattle, which have since multiplied exceedingly. But the colony not being settled under any public encouragement, each planter laboured for himself, and the island became a prey to every rapacious invader, which disheartened the inhabitants so much, that all industry was lost among

them. Their chief suffering was from a party wild Irish, who landed here after the Revolution and treated them worse than any of the Free pirates, who had attacked them before. The people of Barbadoes, and other English Caribbees, knowing the value of the soil, several of them removed to Anguilla, where they remain for many years, and even carried on a profitable trade, though without any government, either civil or ecclesiastical. In 1745, their militia, though not exceeding 100 men, defended a breast work against 1000 French, who came to attack them and at last obliged them to retire, with the loss of 150 men, besides carrying off some of their arms and colours, as trophies of their victory. Since that time, the inhabitants have subsisted mostly by farming: though they still plant sugar, the island is said to be capable of great improvements. It lies in the Atlantic Ocean, 100 m. N. of St Christopher's. Long. 63. 10. W. Lat. 18. 15. N.

ANGUILLABA, a small town of Italy, in the patrimony of St Peter, 15 miles N. W. of Rome.

ANGUILLARA, the name of, 1. a lake in Lombardia; 2. a small town of Padua: and 3. a town of Italy, belonging to the pope.

ANGUILLIFORMES, [from *anguilla*, an eel, and *forma*, shape,] in ichthyology, a very large class of fishes, which are soft and lubricous like the eel, and have no scales. Most of the fishes comprised in this class, are long bodied also like the eel. Some of them have neither fins at the head nor gills nor belly, as the *murus* and *lampetra*; others have fins at their gills, but none on their bellies, as the sea serpent, eel, conger, ophidion, and ammodytes. And others have both, as the turbot, mussels, alaudæ, and the like. The word is also applied to some kinds of worms.

ANGUINA, See *TRICOSANTHES*.

ANGUINEAL HYPERBOLA, See *HYPERBOLA* and *CURVE*.

ANGUINEI VERSUS, in poetry, verses, the words of which may be read backwards. They are also called recurrent verses. Such, e. g. as

Optimum jus, lex amica, vox dispersa.

Dispersa vox, amica lex, jus optimum.

In others, such as the following, the letters may be read backwards:

Otto tenet mappam, madidam mappam tenet Otto.

ANGUINUM OVUM, the *adder stone*, a fabulous kind of egg, said to be produced by the livid livid of a cluster of serpents, and possessed of certain magical virtues. The superstition in respect to these, was very prevalent among the ancient Britons, and there still remains a strong tradition of it in Wales. Pliny gives a similar account of it, lib. xix. cap. 3. This wondrous egg seems to have been nothing more than a bead of glass, used by the Druids, as a charm to impose on the vulgar; whom they taught to believe, that the possessor would be fortunate in all his attempts, and that it would gain him the favour of the great: so ancient and uniform has priestcraft been in all ages, religions, and nations. Our modern Druids, says Mr Pennant, give much the same account of the ovum anguinum, (*glain neidr*, the Welsh call it, or the adder gem,) as the

As was her sister ; whether dread did dwell,
Or *anguish* in her heart, is hard to tell.

Fairy Queen.

Virtue is but *anguish*, when 'tis several,
By occasion wak'd, and circumstantial ;
True virtue's soul's always in all deeds all.

Donne.

They had prosecutors, whose invention was as
great as their cruelty. Wit and malice conspired
to find out such deaths, and those of such incre-
dible *anguish*, that only the manner of dying was
the punishment, death itself the deliverance.

South.

Perpetual *anguish* fills his anxious breast,
Not stopt by business, nor compos'd by rest ;
No musick cheers him, nor no feast can please.

Dryden.

* **ANGUISHED.** *adj.* [from *anguish*.] Seized
with anguish ; tortured ; excessively pained ; not
now in use.—

Feel no touch
Of conscience, but of fame, and be
Anguish'd, not that 'twas sin, but that 'twas she.

Donne.

ANGUISHOUS, full of anguish. *Chauc.*

ANGUITENENS. See **ANGUIFER**.

ANGUIUM LAPIS, a name given to a sup-
posed stone in Germany, which is of cylindric fi-
gure, and has a cavity capable of admitting a fin-
ger, and of a yellow colour, with a great many
variegations. The vulgar call it *duchaneck*, and
have an idle opinion of its originating from a ser-
pent ant. De Boot, who had seen many of them,
declares them to be fictitious, and made of glass
tinged with different colours. See **ANGUINUM**
OVUM.

* **ANGULAR.** *adj.* [from *angle*.] 1. Having
angles or corners ; cornered.—As for the figure of
crystal, it is for the most part hexagonal, or fix
cornered, being built upon a confused matter, from
whence, as it were from a root, *angular* figures
arise, even as in the amethyst and basalt. *Brown's*
Vulgar Errs. 2. Consisting of an angle.—The dis-
tance of the edges of the knives from one another,
at the distance of four inches from the *angular*
point, where the edges of the knives meet, was
the eight part of an inch. *Newton's Opticks.*

(1.) **ANGULAR MOTION** is a compound kind of
motion, wherein the moveable both slides and re-
volves at the same time ; such as the motion of
the wheel of a coach, or other vehicle.

(2.) **ANGULAR MOTION**, in astronomy, is the in-
crease of the distance between any two planets, re-
volving round any body as the common centre of
their motion. The quantity of this motion is ex-
pressed by two right lines, drawn from the centre
to the revolving bodies ; which will open wider,
and consequently the angle will grow greater, as
the revolving bodies part farther from one ano-
ther.

ANGULARIS SCAPULÆ, in anatomy, a name
given by Winslow, and others, to the muscle of
the shoulder generally called the *levator scapulae*.

* **ANGULARITY.** *n. f.* [from *angular*.] The
quality of being angular, or having corners.

* **ANGULARLY.** *adv.* [from *angular*.] With
angles or corners.—Another part of the same so-
on afforded us an ice *angularly* figured. *Boyle.*

* **ANGULARNESS.** *n. f.* [from *angular*.] T
quality of being angular.

* **ANGULATED.** *adj.* [from *angle*.] Form
with angles or corners.—Topazes, amethysts,
emeralds, which grow in the fissures, are co-
narily crystallized, or shot into *angulated* figure
whereas, in the strata, they are found in ru-
lumps, like yellow, purple, and green pebbles.
Woodward.

* **ANGULOSITY.** *n. f.* [from *angulus*.] Ang-
ularity ; cornered form. *Di&*.

* **ANGULOUS.** *adj.* [from *angle*.] Hooked
angular.—Nor can it be a difference, that
parts of solid bodies are held together by heat
and *angulous* involutions ; since the coherence
the parts of these will be of as difficult a conce-
tion. *Glanville.*

ANGURIA, the WATER-MELON : A genus
the diandria order, belonging to the monoe-
class of plants ; and in the natural method run-
ing under the 34th order, Cucurbitaceæ. The
essential characters are these : The male calyx
quinquefid, and the corolla quinquepetalous : The
female calyx and corolla the same : The pericar-
pium is a pome beneath, with two cells : The
seeds are numerous. Of this genus, Linna-
reckons three species, viz.

1. **ANGURIA PEDATA** ;

2. **ANGURIA TRIFOLIATA** ; and

3. **ANGURIA TRILOBATA.**

} Of these
} ly one is
} species known

in this country, by the name of *Citrus*. The fruit
cultivated in Spain, Portugal, Italy, and other
warm countries of Europe ; as also in Africa, Asia
and America ; where it is esteemed on account
its wholesome cooling quality ; but in Britain
is held in little estimation. To have this fruit good
some seeds must be procured of three or four years
old ; new seeds being apt to produce vigorous
plants, which are seldom so fruitful as those of
moderate strength. These are to be sown in the
hot-bed for early cucumbers. Some new dung
be prepared in the beginning of February, which
should be thrown into a heap to heat, as is pre-
pared for early cucumbers. The bed is then to be
made in the same manner as for the musk-melon,
covering the dung about five inches thick with
loamy earth ; but as these plants require much
more room than either cucumbers or common
melons, there should be but one plant put into
three-light frame. A hill of the same loamy earth
should therefore be raised a foot and a half high,
the middle light of each frame ; into which, when
the bed is of a proper temper for heat, the plant
should be carefully planted, observing to water
and shade them until they have taken good root.
As to other particulars, their management dif-
fers very little from that of the musk-melon ; and
they must frequently have fresh air admitted to
them ; and, when the nights are cold, the glass
must be covered with mats to keep the bed
warm.

ANGUS, a county of Scotland, famous in an-
cient times for having given a title to the brave
Douglasses Earls of Angus. It is frequently called
Forfarshire, especially in the acts of the British
Parliament, from Forfar, the chief town of the
county. It is bounded on the N. by Aberdeen-
shire ; on the N. E. by the Mearns, or Kincardine-
shire.

The
With
a
Doubtless
Fertile, dense, evergreen
Palm trees from both
country. It is bounded
here, on the N. by the

It has produced many princes who make a figure in the German history. Joachim Er-

part of its back is brown spotted with yellow, and the rest all black; it is common on the Brazilian shores, and feeds on fish.

ANHLOTE, in law, a single tribute or tax. The words *anblote*, and *anscot*, are mentioned in the laws of William the Conqueror; and their sense is, that every one should pay, according to the custom of the country, his part and share, as scot and lot, &c.

ANHOLT, or ANHALT. See ANHALT.

ANHUIBA, in botany, a name by which some authors call the *sassafras* tree, the wood of which is much used in medicine.

ANHYDROS, in botany, a name given by the ancient Greeks, and from them copied by the Romans in the time of Pliny, to express one of those kinds of the *strychna*, or night-shades, which, when taken internally, caused madness.

ANI, in ornithology, the name of a Brazilian bird, somewhat allied to the parrot kind. It is about the size of a thrush, and is all over black. It is very common in the woods, but is not eaten.

(1.) ANIAN, a barren sandy desert lying on the east coast of Africa. It is so excessively hot, and otherwise inhospitable, that it contains but very few inhabitants, except some wandering Arabs, who live in camps.

(2.) ANIAN, the name of a strait, formerly supposed to lie between the north east of Asia, and the north west of America; but now found to exist only in imagination.

ANIANE, a town of France, in the department of Herault, at the foot of the mountains, near the river Arre. Long. 3. 40. E. Lat. 43. 45. N.

ANICIUS, the surname of a patrician family in ancient Rome, several of whom were consuls, and honoured with triumphs; and one of whom was the first Roman senator who embraced the Christian faith.

ANIELLO, or MASSANIELLO. See NAPLES, HISTORY OF.

ANJENGO, a small town and factory, with a fort, on the coast of Malabar, in the peninsula on this side the Ganges, belonging to the East India Company. The fort is small, but neat and strong; it is a square with four bastions, having eight guns mounted on each, carrying a ball of 18 pounds. Two of these bastions face the sea, the other two the country. Besides these, there is a line of 18 or 20 guns pointing towards the sea, of 18 and 24 pounders. About a pistol shot from the back of the fort, runs a river, which, besides being a security to the factory, adds much to the agreeable situation of the place. This river has its source in some distant mountains; and descending, in a course from the north and east, it afterwards turns, in several pleasing meanders, so far to the west, as to wash the bottom of our factory's garden, and at last winding to the south, it empties itself into the sea. Several beautiful small islands too, which are washed by its current, diversify the scenery, and greatly heighten the beauty of the prospect. This settlement supplies our East India Company with pepper, calicoes; and its situation is also very convenient, for giving proper intelligence to our ships touching here from Europe, or from any part of India.

76. 1. E. Lat. 7. 0. N.

* ANIENTED. *adj.* [*aneantir*, Fr.] Frustrated; brought to nothing.

* ANIGHTS. *adv.* [*a* for *at*, and *night*.] the night time.—Sir Toby, you must come in earlier *anights*; my lady takes great exceptions to your ill hours. *Shakespeare*.

* ANIL. *n. f.* The shrub from whose leaves and stalks indigo is prepared.

ANIL, or NIL, in botany, a synonyme of species of indigofera. See INDIGOFERA.

* ANILENESS. } *n. f.* [*anilitas*, Lat.] The state

* ANILITY. } of being an old woman in the old age of women.

(1.) ANIMA among divines and naturalists, denotes the soul, or principal of life, in animals. See SOUL.

(2.) ANIMA, in chemistry, the volatile principle in bodies, whereby they are capable of being raised by the fire: Thus *anima jaspidis* the soul of Jasper, &c.

(3.) ANIMA, in music, signifies with life and spirit, and expresses a degree of movement similar to *Vivace*, being a medium between *Allegro* and *Largo*.

(4.) ANIMA, in pharmacy, is applied to simple medicines, exalted by solution and extraction to a high degree of power. In this sense, we meet with *anima aloes*, *anima rhabarbari*, *anima venenis*, &c.

ANIMA ARTICULORUM, a denomination sometimes given to hermodactyls; on account of the efficacy in disorders of the joints.

ANIMA HEPATIS, soul of the liver; a term applied by the chemists to the *sal martis*, salt of iron or steel; on account of its use in distempers of that part. It is more usually styled *vitriolum martis*.

ANIMA MUNDI, [*i. e.* the Soul of the World] a certain pure ethereal substance or spirit, diffused according to many of the ancient philosophers through the mass of the world, informing, actuating, and uniting the divers parts thereof into one great, perfect, organical, and vital body of animal. Plato treats at large of the *ψυχη κοσμου*, in his *Timæus*; and is even supposed to be the author of the *dogma*; yet interpreters are much at a loss about his meaning. Aristotle, however, taking it in the common and obvious sense, strenuously opposes it. The modern Platonists explain their master's *anima mundi* by a certain universal ethereal spirit, which in the heavens exists perfectly pure, as retaining its proper nature; but on earth pervading elementary bodies, and intimately mixing with all the minute atoms thereof, it assumes somewhat of their nature, and becomes of a peculiar kind. They add, that this *anima mundi*, which more immediately resides in the celestial regions as its proper seat, moves and governs the heavens in such a manner, as that the heavens themselves first received their existence from the fecundity of the same spirit: for that this *anima*, being the primary source of life, everywhere breathed a spirit like itself, by virtue whereof of various kinds of things were framed conformable to the divine ideas.

ANIMA PULMONUM, crocus, or saffron, so called on account of its supposed effect in diseases of the lungs.

ANIM.

ANIMA SATURNI, a white powder obtained by mixing distilled vinegar on litharge, of considerable use in enamelling. See **ENAMEL**.

* **ANIMABLE**. *adj.* [from *animate*.] That which may be put into life, or receive animation.

* **ANIMADVERSION**. *n. f.* [*animadversio*, *Lat.*] 1. Reproof; severe censure; blame.—He reprimanded their commissioners with severe and sharp animadversions. *Clarendon*. 2. Punishment. When the word of *animadversion* is mentioned, it has a preface on or upon before it.—When a bill is introduced in parliament, it is usual to have the subject handled by pamphlets on both sides; and the least *animadversion* upon the authours. 3. In law.—An ecclesiastical censure, and a secular *animadversion*, are different things; the former has a relation to a spiritual punishment, but an *animadversion* has only a respect to a temporal one; as, degradation, and the delivery of the person over to the secular court. *Argemont*. 4. Perception; power of notice:—The soul is the sole percipient which receives *animadversion* and sense properly so called.

ANIMADVERSION, in literature, is used to signify, sometimes correction, sometimes remarks upon a book, &c. and sometimes a serious censure upon any point.

* **ANIMADVERSIVE**. *adj.* [from *animadvert*.] That has the power of perceiving; percipient:—The representation of objects to the mind, the only *animadversive* principle, is conveyed by motions made on the immediate organs of sense. *Clarke*.

* **ANIMADVERSIVENESS**. *n. f.* [from *animadvert*.] The power of animadverting, or animadverting. *DiEl.*

* **To ANIMADVERT**. *v. n.* [*animadverto*, *Lat.*] 1. To pass censures upon.—I should not animadvert on him, who was a painful observer of the decorum of the stage, if he had not used extreme severity in his judgment of the incomparable Shakespeare. *Dryden*. 2. To inflict punishment. In both senses with the particle upon.—If the Authour of the universe animadverts upon men here below, how much more will it become him to do it upon their entrance into a higher state of being? *Greav.*

* **ANIMADVERTER**. *n. f.* [from *animadvert*.] He that passes censures, or inflicts punishments.—God is a strict observer of, and a severe animadverter upon, such as presume to partake of those mysteries, without such a preparation. *South.*

(1.) * **ANIMAL**. *adj.* [*animalis*, *Lat.*] 1. That which belongs or relates to animals.—There are things in the world of spirits, wherein our ideas are very dark and confused; such as their union with animal nature, the way of their acting on material beings, and their converse with each other. *Watt's Logic*. 2. Animal functions, distinguished from natural and vital, are the lower powers of the mind, as, the will, memory, and imagination. 3. Animal life is opposed, on one side, to intellectual, and, on the other, to vegetable. 4. Animal is used in opposition to spiritual or rational; as, the animal nature.

(2.) * **ANIMAL**. *n. f.* [*animal*, *Lat.*] 1. A living creature corporeal, distinct, on the one side, from pure spirit; on the other from mere matter.—Animals are such beings, which, besides the power of growing, and producing their like, as plants and vegetables have, are endowed also with sensation and spontaneous motion. Mr Ray gives two schemes of tables of them.

* **ANIMALS** † are either

Sanguinous,
that is have blood;
and breathe, either by

Or

Exsanguineous,
that is without blood; which
may be divided into

Two Ventracles Or But one Ventricle in their heart,
either heart, as frogs, tortoises,
and either, and serpents.

Or

Gills,
as all sanguineous
fishes except the
whale kind.

Greater, and Lesser,
and those either as Insects of
all sorts, ei-
ther
Naked, Or Covered with
a tegument.

Parous, Or Oviparous
as Birds.

Aquatic, Terrestrial,
as Quadru-
peds.

Terrestrial,
as naked
snails.

Aquatic,
as the
poult,
cuttle
fish, &c.

Crustaceous, Or Testaceous,
as lobsters and crab
fish.

Univalve, Bivalve, or Tur-
as limpets, as oys-
ters, as peri-
muscles, winkles
cockles; snails,
&c.

Vivipa-

VOL. II. PART. I.

U

Vivipa-

Though we are determined strictly to adhere to our plan of giving the whole articles in Dr JOHNSON'S Dictionary verbatim in the course of this work, yet we found the Tables of ANIMALS, above quoted by the Author from RAY, so extremely faulty, not only in point of arrangement, but even in the language, that we thought it our duty to make the necessary improvements upon them, in both respects. The tables, as they stand in Dr Johnson's Dictionary, are hardly legible, not to say unintelligible: and to add to their obscurity

Viviparous hairy *Animals*, or quadrupeds, are either

Hoofed,
which are either

Or

Clawed or digitate,
having the foot di-
vided into either

Whole-footed,
or hoofed, as
the horse and
ass;

Or

Cloven-footed,
having the
hoof divided
into either

Two parts or toes,
having two nails,
as the camel kind;

Or Many toes
or claws;
either

Two principal parts,
called bifulca, either

Or

Four parts,
or Quadrif-
ulca, as the
hippopota-
mus

Undivided,
as the Ele-
phant,

Or

Divided;
which have
either

Such as chew not the
cud, as swine;

Or Ruminant,
i. e. such as
chew the cud;
divided into

Broad nails,
and an human-
shape, as apes;

Or Narrower,
more point-
ed nails.

Such as have perpetual
and hollow horns; as the

And

Such as have
solid, branch-
ed and decidu-
ous horns, as
the deer kind.

Beef kind, Sheep kind, & Goat kind.

In respect of their teeth, they are divided into

Such as have
many fore teeth, or cutters
in each jaw, viz.

and

Such as have
Only two large and
markable fore teeth,
which are phytivore
and are called the h
kind.

The greater,
which have either

and

The lesser, the ver-
min or weasel kind.

A shorter snout
& rounder head
as the cat kind;

Or

A longer snout
as the dog
kind.

* Vegetables are proper enough to repair *animals*, as being near of the same specifick gravity with the animal juices, and as consisting of the same parts with animal substances, spirit, water, salt, oil, earth; all which are contained in the sap they derive from the earth. *Arbutnot on Aliments*.—Some of the animated substances have various organical or instrumental parts, fitted for a variety of motions from place to place, and a spring of life within themselves, as beasts, birds, fishes, and insects; these are called *animals*. Other animated substances are called vegetables, which have within themselves the principles of another sort of life and growth, and of various productions of leaves and fruit, such as we see in plants, herbs, and trees. *Watt's Logic* 2. By way of contempt, we say of a stupid man, that he is a *stupid Animal*.

(3.) ANIMAL, CHARACTERISTIC MARK OF AN.
To the above definitions of an animal, we would

add, as a still more accurate and distinctive characteristic, that an animal is an organized living body, endued with sensation: for minerals are said to grow or increase, plants to grow and live, but animals alone have sensation. It is this property alone that can be deemed the essential characteristic of an animal; and by which the animal and vegetable kingdoms seem to be so essentially separated, that we cannot even imagine the least approximation of the one to the other. The naturalists, indeed, who have supposed the distinction between animals and vegetables to consist in any thing else, have found themselves greatly embarrassed; and have generally agreed, that it was extremely difficult, if not impossible, to set the boundaries between the animal and vegetable kingdoms. But this difficulty will be easily seen to arise from their taking the characteristic mark of the animal kingdom, from something that was evidently common to both. Thus Boerhaave

tempted to remove the obscurity, the conjunction, EITHER, occurs a dozen of times, without so much as once being followed by its indispensibly necessary copulative, OR!—No rule in grammar, or even in common language, is more obviously requisite to be uniformly observed, than, that, where one alternative is prefaced by either, the other should be introduced by or. We have therefore supplied these deficiencies, as well as inserted the conjunction, AND, in five places where divisions are mentioned: and, at the same time, we have put the table into a form so plain and intelligible, that no reader can be at a loss to understand them, at first glance. The freedoms we have used the more readily, that the blunders, having originated from Mr Ray, cannot be imputed to Dr Johnson, excepting in so far as the latter has made them his own, by adoption; as has been done by Dr Chambers and Dr Rees.

ful flowers. As to one species particularly, mentioned by Abbé Diequemarre, in the *Phil. Trans.* for 1773, art. 37. the purest white, carmine, and ultramarine, are said to be scarce sufficient to express their brilliancy. The bodies of some of them are hemispherical, of others cylindrical, and of others shaped like a fig. Their substance likewise differs; some are stiff and gelatinous, others fleshy and muscular; but all of them are capable of altering their figure when they extend their bodies and claws in search of food. They are found in many of the rocky coasts of the West India islands, and likewise on some parts of the coast of England. They have only one opening, which is in the centre of the uppermost part of the animal; round this are placed rows of fleshy claws; this opening is the mouth of the animal, and is capable of great extension. The animals themselves, though exceedingly voracious, will bear long fasting. They may be preserved alive a whole year, or perhaps longer, in a vessel of sea water, without any visible food; but, when food is presented, one of them will successively devour two muscles in their shells, or even swallow a whole crab as large as a hen's egg. In a day or two the crab shell is voided at the mouth, perfectly cleared of all the meat. The muscle shells are likewise discharged whole, with the two shells joined together, but entirely empty, so that not the least particle of fish is to be perceived on opening them. An anemone of one species will even swallow an individual of another species; but after retaining it ten or twelve hours, will throw it up alive and uninjured. Through this opening also it produces its young ones alive, already furnished with little claws, which, as soon as they fix themselves, they begin to extend in search of food. One of the extremities of the sea-anemone resembles, the outward leaves of that flower; while its limbs are not unlike the flag or inner part of it. By the other extremity it fixes itself, as by a sucker, to the rocks or stones lying in the sand; but it is not totally deprived of the power of progressive motion, as it can shift its situation, though very slowly.

(2.) **ANIMAL FLOWERS, BARBADOES.** In Hughes's *Natural History of Barbadoes*, an account is also given of several species of animal flowers. They are described as only found in a basin in one particular cave; and of the most remarkable species mentioned by him we have the following description. "In the middle of the basin, there is a fixed stone, or rock, which is always under water. Round its sides, at different depths, seldom exceeding 18 inches, are seen, at all times of the year, issuing out of little holes, certain substances that have the appearance of fine radiated flowers, of a pale yellow, or a bright straw colour, slightly tinged with green, having a circular border of thick set petals, about the size of, and much resembling, those of a single garden marigold, except that the whole of this seeming flower is narrower at the discus, or setting on of the leaves, than any flower of that kind. I have attempted to pluck one of these from the rock, to which they are always fixed; but never could effect it: for as soon as my fingers came within two or three inches of it, it

would immediately contract close together its low border, and shrink back into the hole of rock; but, if left undisturbed for about four nutes, it would come gradually in sight, expanding, though at first very cautiously, its feel leaves, till at last it appeared in its former ble. However, it would again recoil, with a surpr quickness, when my hand came within a distance of it. Having tried the same experiment by attempting to touch it with my cane, as small slender rod, the effect was the same. The I could not by any means contrive to take pluck from the rock one of these animals, until yet I once cut off (with a knife which I had for a long time out of sight, near the mouth an hole out of which one of these animals appeared) two of these seeming leaves. These, w out of the water, retained their shape and our; but, being composed of a membrane substance, surprisingly thin, it soon shrivelled and decayed."

(3.) **ANIMAL FLOWERS, CLUSTER.** A peculiar species of animal flowers has been found some of the islands ceded to Britain at the treaty of peace with France; and the following account of them was published in the *Philosophical Transactions*, vol. 57. by Mr Ellis, in a letter to Lord Hillsborough. "This compound animal, which is of a tender fleshy substance, consists of many tubular bodies, swelling gently towards the upper part, and ending like a bulb very small onion; on the top of each is its mouth surrounded by one or two rows of tentacles, claws, which when contracted look like circles beads. The lower part of all these bodies has a communication with a firm fleshy wrinkled tube which sticks fast to the rocks, and sends forth other fleshy tubes, which creep along them in various directions. These are full of different kinds of these remarkable animals, which rise up irregularly in groups near to one another. This adhering tube, that secures them fast to the rock or shelly bottom, is worthy of our notice. The knobs that we observe, are formed in several parts of it by its insinuating itself into the inequalities of the coral rock, or by grasping pieces of shells, part of which still remain in it, with the fleshy substance grown over them. This shows us the instinct of nature, that directs these animals to preserve themselves from the violence of the waves, not unlike the anchoring of mussels by their fine silken filaments that end in suckers, or rather like the shelly basis of the serpula, the worm shell, the tree oyster, and the slipper limnace, &c. whose bases conform to the shape of whatever substance they fix themselves to, grasping it fast with their testaceous claws, to withstand the fury of a storm. When we view the inside of this animal dissected lengthwise, we find like a little tube leading from the mouth to the stomach, from whence rise 8 wrinkled small guts in a circular order, with a yellowish soft substance in them; these bend over in the form of arches towards the lower part of the bulb, from whence they may be traced downwards, to the narrow part of the upright tube, till they come to the fleshy adhering tube, where some of them may be perceived entering into a papilla, or the beginning of a new tube."

Armoscope.

Andromeda Paniculata.

Anemometer.



1

Artocarpus. Bread Fruit Tree.

Atropa Mandragora.

Animal Flowers.



Ardea Pavonia

or Crowned Crane.

Ardea Americana
or Hooping Crane.

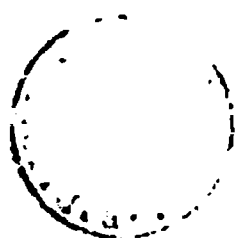
Anemometer



Ardea Herodias.



Engraved for Edwards's Portfolio.



ANIMA & FLOWERS.

FIG. 1.

Fig. 6.

Fig. 2.

Fig. 3.



Fig. 4.

Fig. 5.

Fig. 1.

ASTERIAS.

Fig. 10.



Nº 1

Fig. 10.
Nº 1



Fig. 10. *Hydra*



Fig. 11.



Fig. 11.
Nº 2



Fig. 13. *Hydra*



Fig. 13.



Fig. 14. *Hydra*



Fig. 15. *Hydra*



Fig. 17. *Antalbes*



Fig. 1. *Aphis*



Fig. 8.

Aphrodite Aralesta



gining of an animal of the like kind, most probably to convey it nourishment till it is provided with claws: the remaining part of these slender tubes are continued on in the fleshy tube, without doubt for the same purpose of producing and supporting more young ones from the same common parent. The many longitudinal fibres that we observe lying parallel to each other, on the inside of the semi-transparent skin, are all inserted into several claws round the animal's mouth, and are plainly the tendons of the muscles for moving and directing the claws at the will of the animal: these may be likewise traced down to the adhering tube. As this specimen has been preserved in spirits, the colour of the animal, when living, cannot be certainly known; it is at present of a pale yellowish brown. With regard to its name, it may be called *Actinia sociata*, or *Cluster Animal-flower*."

(4.) ANIMAL FLOWERS, REPRODUCTIVE POWER OF. The Abbe Dicquemarre, by many curious, though cruel, experiments, related in the *Phil. Trans.* for 1773, has shewn, that these animals possess, in a most extraordinary degree, the power of reproduction; so that scarce any thing more is necessary to produce as many sea anemones as we please, than to cut a single one into as many pieces. A sea anemone being cut in two, by a section through the body, that part, where the limbs and mouth are placed, eat a piece of a mackerel, offered to it, soon after the operation, and continued to feed and grow daily, for three months after. The food sometimes passed through the animal; but was generally thrown up again, considerably changed, as in the perfect sea anemone. In about two months, two rows of limbs were perceived growing out of the part where the incision was made. On offering food to this new mouth, it was laid hold of and eat; and the limbs continually increasing, the animal gradually became as perfect as those which had never been cut. In some instances, however, he found, that, when one of these creatures was cut through, two limbs would be produced from the cut place, those at the mouth remaining as before; so that a monstrous animal was the consequence, having two mouths, and feeding at both ends. Having put some of them into a pan of water, set over a slow fire, he found that they lost their life at 50 degrees of Reaumur's thermometer. To avoid the imputation of cruelty in these experiments, the author argues the favourable consequences that have attended his operations on the sea anemones, which have been so fortunate as to fall into his hands; as he hath not only multiplied their existence, but also renewed their youth; which last, he adds, "is surely no small advantage." The reproductive power of the Barbadoes animal flower is prodigious. Many people coming to see these strange creatures, and occasioning some inconvenience to a person through whose grounds they were obliged to pass, he resolved to destroy the objects of their curiosity; and, that he might do so effectually, caused all the holes out of which they appeared, to be carefully bored and drilled with an iron instrument, so that we cannot suppose but their bodies must have been entirely crushed to a pulp: ne-

vertheless, they again appeared in a few weeks, from the very same places. Plate XIV. *a* represents the *actinia sociata*, or clustered animal-flower, described by Mr Ellis, with its radical tube adhering to a rock, and one of the animals stretching out its claws. *b* A perpendicular dissection of one of the bodies, to show the gullet, intestines, stomach, and fibres or tendons that move the claws: with a young one arising out of the adhering tube. Plate XIII. Fig. 1. The *actinia* after, or animal-flower of the newly ceded islands. Fig. 2. The *actinia anemone*, or sea anemone from the same place. Fig. 3. The under part of the same by which it adheres to the rocks. Fig. 4. The *actinia helianthus*, or the sea sun flower from ditto. Fig. 5. The under part of the same. Fig. 6. The *actinia dianthus*, or sea carnation, from the rocks at Hastings in Sussex. This animal adheres by its tail, or sucker, to the under part of the projecting rocks opposite to the town; and, when the tide is out, has the appearance of a long white fig: this is the form of it, when put into a glass of sea water. It is introduced here, as a new variety of this animal, not yet described.

(5.) ANIMAL FLOWERS, SCOTTISH. We have already mentioned, under the article ACTINIA, that animal flowers are found in as great beauty and variety, on the coast of Galloway, as any where in the West Indies. They are repeatedly taken notice of in Sir J. Sinclair's Statistical Account of Scotland. Mr Little, minister of Colvend, mentions the polypus or sea anemone, among the productions of that coast.—Mr Muirhead, minister of Urr, gives the following particular description of them. "About 5 years ago, I discovered in the parish of Colvend, the animal flower, in as great perfection and variety, as it is in Jamaica. The lively colours, and the various and elegant forms of the polypus on this coast, are truly equal to any thing related by natural historians, respecting the sea flowers of any other country. To see a flower of purple, of green, blue, yellow, &c. striving to catch a worm, is really amusing."—And Mr Marshall, minister of Buittle, has allotted a section of his Statistical Account of his parish to *animal flowers*; wherein he says, "Till of late, perhaps, it has not been much adverted to, that the animal flower, or water polypus, is even common amongst the shores of Buittle, Colvend, and very likely around the whole coast of the Stewartry of Galloway. The form of these polypuses is elegant, and pleasantly diversified. Some are found resembling the sun-flower, some the hundred-leaved rose, but the greater number bear the likeness of the poppy. The colours differ as much as the form. Sometimes the animal flower is of a deep purple, frequently of a rose colour, but mostly of a light red or fleshy hue. The most beautiful of them, that could be picked up, have often been carried from the shore of Colvend, 12 or 15 miles up into the country, where they have lived, fed on worms, and even bred for several weeks, and might have existed much longer, if they could have been supplied with sea water. In a word, it seems probable, that an industrious naturalist might discover, on this coast, some of these singular

gular animals, not much inferior to those produced in the Antilles, and other tropical countries."

ANIMAL FOOD. See FOOD.

ANIMAL FOSSILE SUBSTANCES, those found buried in the earth, at various depths, and embodied among various strata. These are principally of four kinds: 1. Sea shells. 2. The teeth, bony palate, and bones of fishes. 3. The bones of land animals. And, 4. Complete fish. See FOSSILS.

ANIMAL GODS, *dii animales*, in mythology, those into which human souls were supposed to be converted, by means of certain religious ceremonies. Labeo wrote a treatise, expressly on the animal gods.

ANIMAL HEAT. See HEAT.

ANIMAL MAGNETISM. See MAGNETISM.

ANIMAL MOTION is the same with MUSCULAR MOTION. See ANATOMY, INDEX.

ANIMAL OECONOMY. See ANATOMY, INTRODUCTION, SECT. III.

ANIMALS, PAIRING OF. See PAIRING.

ANIMALS, PREPARATION OF, FOR COLLECTIONS OR MUSEUMS. See QUADRUPEDS, BIRDS, REPTILES.

ANIMAL SECRETION is the act whereby the divers juices of the body are secreted or separated from the common mass of blood, by means of the glands. See ADENOLOGY, under ANATOMY, INDEX.

ANIMAL SPIRIT. See NERVOUS FLUID.

ANIMAL SYSTEM denotes the whole class of beings endowed with animal life, otherwise called ANIMAL KINGDOM.

ANIMALCULA. See ANIMALCULES.

ANIMALCULAR, *adj.* belonging to an animalcule.

(1.) *ANIMALCULE. *n. f.* [*animalculum*, Lat.] A small animal; particularly those which are in their first and smallest state.—We are to know, that they all come of the seed of *animalcules* of their own kind, that were before laid there. Ray.

(2.) ANIMALCULE, FARTHER DEFINITION OF AN. The word in general, signifies a little animal; and thus the term might be applied to every animal which is considerably inferior in size to ourselves. It hath been customary, however, to distinguish by the name of *animalcules* only such animals as are of a size so diminutive, that their true figure cannot be discerned without the assistance of glasses; and more especially it is applied to such as are altogether invisible to the naked eye, and cannot even be perceived to exist but by the assistance of microscopes. By the help of magnifying glasses, we are brought into a kind of new world; and numberless animals are discovered, which from their minuteness must otherwise forever have escaped our observation: and how many kinds of these invisibles there may be, is still unknown; as they are discerned of all sizes, from those which are barely invisible to the naked eye, to such as resist the action of the microscope, as the fixed stars do that of the telescope, and with the best magnifiers hitherto invented appear only as so many moving points. The smallest living creatures our instruments can show are those that inhabit the waters: for though possibly animalcules equally minute, or perhaps more so, may fly in the air, or creep upon the earth, it is scarce pos-

sible to bring such under our examination; but water being transparent, and confining the creatures in it, we are able, by applying a drop of it to our glasses, to discover, to a certain degree of smallness, all that it contains.—Some of the most curious of these animalcules, which have been described by microscopical observers, we shall here give an account of. See § 3—16.

(3.) ANIMALCULES IN PASTE, VINEGAR, &c. When paste is allowed to stand till it becomes sour, it is then found to be the habitation of numberless animalcules, like eels, which may be discerned by the naked eye; and though their form cannot be perfectly distinguished, their motion is very perceptible, and the whole paste will seem to be animated. Fig. 4. represents one of these *anguillæ* magnified. The most remarkable property of these insects is, that they are viviparous. One of them is cut through near the middle, several oval bodies of different sizes will be seen to issue forth. These are young *anguillæ*, each of them coiled up and inclosed in its proper membrane, which is so exquisitely fine, as scarce to be discernible by the greatest magnifier, while it incloses the embryo animal. The largest and most forward immediately break through this covering, unfold themselves, and wriggle about in the water nimbly; others get out, uncoil, and move themselves about more slowly; and the least mature continue entirely without motion. The *urine*, or vessel that contains all these oval bodies, is composed of many ringlets, not unlike the *arteria* of land animals, and seems to be considerably elastic; for as soon as the animalcule is cut in two, the oval bodies are thrust out with some degree of violence, from the springing back of action of this bowel. Upwards of 100 young ones have been seen to issue from the body of a single eel, whereby the prodigious increase of them may be accounted for; as probably several such numerous generations are produced in a short time. They seem to be all prolific; and unless a trial happens to be made upon one that has brought forth all its young, or when the paste has been kept for a very long time, the experiment will always succeed.—This property of these eels being viviparous renders it highly improbable that they ever become flies. Animalcules of a similar kind are likewise found in vinegar; and, like those already described, are found to be viviparous.

(4.) ANIMALCULES IN WHEAT. It is not only in acids that animalcules are seen. In some fields of wheat, many grains may be observed, that appear blackish outwardly, as if scorched; but, when opened, are found to contain a soft white substance, which, attentively considered, appears to be nothing else than a congeries of threads or fibres lying close to each other in a parallel direction, much resembling the unripe down of some thistle on cutting open the flower heads before they begin to blow. This fibrous matter discovers not the least sign of life or motion, unless water is applied; but immediately on wetting, provided the grains of wheat have been newly gathered, the supposed fibres separate, and appear to be living creatures. Their motions at first are very languid, but gradually become more vigorous, twisting and

wriggling



1





ANIMALCULES.

PLXII.

Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.



Fig. 6.



Fig. 7.



Fig. 8.



Fig. 9.

Fig. 10.

Fig. 12.

Fig. 13.



Fig. 11.

Fig. 15.

Fig. 16.

Fig. 17.

Fig. 18.

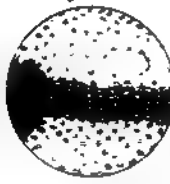
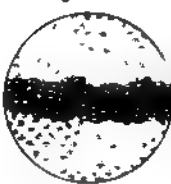


Fig. 19.

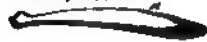


Fig. 21.

Spermatic Animalcules of the Dog according to the first Edition of Linnæus.

Spermatic Animalcules of the Rabbit.

Fig. 22. N. 1.

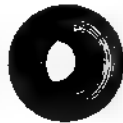
Anguillum Crum.



Fig. 20.



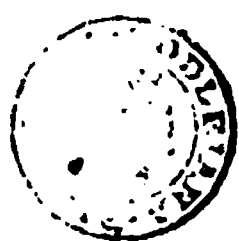
N. 2.



N. 3.



Expanded first, and second, and third, and fourth, and fifth, and sixth, and seventh, and eighth, and ninth, and tenth, and eleventh, and twelfth, and thirteenth, and fourteenth, and fifteenth, and sixteenth, and seventeenth, and eighteenth, and nineteenth, and twentieth, and twenty-first, and twenty-second, and twenty-third, and twenty-fourth, and twenty-fifth, and twenty-sixth, and twenty-seventh, and twenty-eighth, and twenty-ninth, and thirtieth, and thirty-first, and thirty-second, and thirty-third, and thirty-fourth, and thirty-fifth, and thirty-sixth, and thirty-seventh, and thirty-eighth, and thirty-ninth, and fortieth, and forty-first, and forty-second, and forty-third, and forty-fourth, and forty-fifth, and forty-sixth, and forty-seventh, and forty-eighth, and forty-ninth, and fiftieth, and fifty-first, and fifty-second, and fifty-third, and fifty-fourth, and fifty-fifth, and fifty-sixth, and fifty-seventh, and fifty-eighth, and fifty-ninth, and sixtieth, and sixty-first, and sixty-second, and sixty-third, and sixty-fourth, and sixty-fifth, and sixty-sixth, and sixty-seventh, and sixty-eighth, and sixty-ninth, and seventieth, and seventy-first, and seventy-second, and seventy-third, and seventy-fourth, and seventy-fifth, and seventy-sixth, and seventy-seventh, and seventy-eighth, and seventy-ninth, and eightieth, and eighty-first, and eighty-second, and eighty-third, and eighty-fourth, and eighty-fifth, and eighty-sixth, and eighty-seventh, and eighty-eighth, and eighty-ninth, and ninetieth, and ninety-first, and ninety-second, and ninety-third, and ninety-fourth, and ninety-fifth, and ninety-sixth, and ninety-seventh, and ninety-eighth, and ninety-ninth, and one hundredth.



of an inch in length : this it waves to and fro as it moves in the water, or creeps up the side of the glass; but it is not known whether it is hollow, or of what use it is to the creature itself.

(8.) ANIMALCULE, THE BELL-FLOWER, OR BELL-FLOWER POLYPE. These animalcules dwell in colonies together, from ten to fifteen (seldom falling short of the former number, or exceeding the latter), in a slimy kind of mucilaginous or gelatinous case; which, out of the water, has no determinate form, appearing like a little lump of slime; but when expanded therein, has some resemblance to the figure of a bell with its mouth upwards; and usually about half an inch long, and a quarter of an inch in diameter. These bells, or colonies, are to be found adhering to the large leaves of duckweed, and other aquatic plants. They may be most easily discovered by letting a quantity of water, with duckweed in it, stand quietly for 3 or 4 hours in glass-vessels in a window, or other place whence a strong light comes: for then, if any are about the duckweed, they will be found, on careful inspection, extending themselves out of their cases, and making an elegant appearance.—The bell, or case, which these animals inhabit, being very transparent, all the motions of its inhabitants may be discerned through it distinctly. It seems divided internally into several apartments, or rather to contain several smaller sacculi, each of which incloses one of these animals. The openings at the tops of these sacculi, are but just sufficient to admit the creature's head and a small part of its body to be thrust out beyond them, the rest remaining always in the case. It can, however, occasionally retire in its case altogether; and never fails to do so when alarmed by any sudden motion of the water, or of the vessel which contains it.—Besides the particular and separate motion which each of these creatures is able to exert within its own case, and independent of the rest; the whole colony together has a power of altering the position of the bell, or even of removing it from one place to another; and hence this bell is sometimes found standing perfectly upright, as in Pl. XI. fig. 29, 33; and sometimes bending the upper part downwards, as in fig. 30. As these animalcules seem not to choose to stay together in societies whose number exceeds 15, when the colony happens to increase in number, the bell may be observed to split gradually, beginning from about the middle of the upper or anterior extremity, and proceeding downwards towards the bottom, as in fig. 32. till they at last separate entirely, and become two complete colonies independent of each other, one of which sometimes removes to another part of the vessel. The arms of each individual of this colony are set round the head, to the number of 40, having each the figure of an Italic *f*, one of whose hook-ends is fastened to the head; and all together, when expanded, compose a figure shaped somewhat like a horse's shoe, convex on one side next the body, but gradually opening and turning outwards, so as to leave a considerable area within the outer extremities of the arms. When the arms are thus extended, the creature, by giving them a vibrating motion, can produce a current in the water, which brings the animalcules, or

whatever other minute bodies are within the sphere of its action, with great velocity to its mouth, situated between the arms; where they are taken in if liked, or driven away by a contrary motion. The food is conveyed immediately from the mouth or opening between the arms, through a narrow neck, into a passage seemingly correspondent to the œsophagus in land animals; down which it passes into the stomach, where it remains for some time, and then is voided upwards, in small round pellets, through a gut whose exit is near the neck. The body consists of three divisions; in the uppermost of which are contained all the abovementioned intestines, which are only to be discerned when the creature is full, at which time they become opaque. The other two divisions, which are probably fixed to the bell, seem to be of no other use than to give the creature a power of contraction and extension. The arms are not able to contract like those of the common polype; but, when the animal retires into its case, they are brought together in a close and curious order, so as to be easily drawn in. Though their general appearance when expanded is that of a cup whose base and top are of an horse-shoe form, they sometimes separate into four parts, and range themselves as in fig. 36. so as to resemble four separate plumes of feathers. Though their eyes cannot be discovered, yet Mr Baker thinks they have some perception of the light: for when kept in the dark, they always remain contracted; but on being exposed to the light of the sun or of a candle, they constantly extend their arms, and show evident signs of being pleased. Fig. 29. represents one complete colony or bell standing erect, with all the animals out of their kingdom, and their arms extended, exhibiting all together a very pretty appearance. *a* represents two oval bodies, supposed by Mr Baker to be eggs. Fig. 30. shows all the creatures withdrawn into their cells, and the end of the bell hanging downwards. Fig. 33. shows the bell erect, with only one of the animals coming out, in order to show its connection with the bell. Fig. 34. shows the head and arms of a single polype closing together, and disposing themselves in order to be drawn into the bell. Fig. 35. shows one complete animal greatly magnified, to show its several parts more distinctly; viz. *a*, the head, resembling a horse shoe; *bb*, the arms seen from one side; *c*, the narrow neck; *d*, the œsophagus; *e*, the stomach; *f*, the gut or last intestine through which the food passes after being digested in the stomach; *g*, the anus, where the feces are discharged in the little pellets; *hi*, that part of the bell which surrounds the body of the animal, and closes upon it when it retires down. Fig. 37. the head and arms seen in front.

(9.) ANIMALCULE, THE BEROE. Mr Ellis, in describing this Animalcule, complains, that “the excellent Linnæus has joined the *beroe* with the *valvæ*, one of the animalcula infusoria. The *beroe* is a marine animal, found on our coasts; of a gelatinous transparent nature, and of an oval or spherical form, about half an inch to an inch diameter; divided like a melon into longitudinal ribs, each of which is furnished with rows of minute fins; by means of which, this animal, like the a-

Fig. 4. is the *volvox torquilla*, or wryneck. At (a) is represented its divided state; at (b) and (c) its natural state: this is common to most vegetable infusions, as is the following. Fig. 5. is the *volvox volutans*, or the roller. At (a) the animal is separated, and becomes two distinct beings, each swimming about and providing for itself: this is often the prey of another species of this genus, especially while it is weak by this separation, not being so active for some time till it can recover itself. At (c) the animal appears to be hurt on one side; this impression in a little time is succeeded by another in the opposite side, as at (b), which soon occasions a division. At (d) is the side view, and at (e) the front-view, of the natural shape of the animal. Fig. 6. is the *volvox oniscus*, or wood-louse. At (a) is the natural shape of it, as it appears full of little hairs both at the head and tail; with those at the head, it whirls the water about to draw its prey to it; the feet, which are many, are very visible, but remarkably so in a side-view at (d). At (b) it is represented beginning to divide; and at (c) the animals are ready to part: in this state, as if in exquisite pain, they swim round and round, and to and fro, with uncommon velocity, violently agitated till they get asunder. This was found in an infusion of different kinds of pine branches. Fig. 7. is the *volvox terebella*, or the gimlet. This is one of the largest of the kind, and is very visible to the naked eye. It moves along swiftly, turning itself round as it swims, just as if boring its way. (a) and (b) are two views of its natural shape, (c) shows the manner of its dividing. When they are separated, the lower animal rolls very awkwardly along, till it gets a groove in the upper part. (d) represents one of them lying torpid, by means of the juice of the horse-shoe geranium, with its fins extended. This animal is found in many infusions, particularly of grass or corn. Fig. 8. is the *volvox vorax*, or glutton. This animal was found in an infusion of the Tartarian pine; it varies its shape very much, contracting and extending its proboscis, turning it to and fro, in various directions, as at a, b, c, d, e. It opens its proboscis underneath the extremity, when it seizes its prey. The less active animals, that have been divided, such as those at fig. 3. (a), and at fig. 4. (a), serve it as food, when they come in its way: these it swallows down instantly, as it is represented at fig. 8. h and i. At (f) it is ready to divide, and at (g) it is divided; where the hinder-part of the divided animal has got a proboscis or beak, to procure nourishment for itself, and soon becomes a distinct being from the fore part.

(16.) **ANIMALCULE, THE VORTICELLA, OR WHEEL.** This animalcule is found in rain water that has stood some days in leaden gutters, or in hollows of lead on the tops of houses; or in the slime or sediment left by such water; and perhaps may also be found in other places: but if the water standing in gutters of lead, or the sediment left behind it, has any thing of a lead colour in it, one may be almost certain of finding them therein. Though it discovers no signs of life except when in the water, yet it is able of continuing alive for many months after taken out of the water, and kept in a state as

dry as dust. In this state it is of a globular shape exceeds not the bigness of a grain of sand and no signs of life appear: but, being put into water, in half an hour, a languid motion begins, the globule turns itself about, lengthens itself by slow degrees, assumes the form of a lively maggot, and most commonly in a few minutes afterwards puts out its wheels; swimming vigorously through the water, as if in search of food; or fixing itself by the tail, works the wheels in such a manner as to bring its food to it. Pl. XI. Fig. 23. and 24. show the wheel animalcule; in its globular form fig. 11, and 12. in its maggot state; and fig. 13, 14, 15, 16, 17, 18, 19, 20, 21, and 22, show the different appearances of its wheels, and all its various intermediate changes between the globular and maggot state. The most remarkable part of this animalcule is its wheel work. This consists of a couple of semicircular instruments round the edges of which many little fibrillæ move themselves very briskly, sometimes with a kind of rotation, and sometimes in a trembling or vibrating manner. When in this state, it sometimes unfastens its tail, and swims along with great deal of swiftness, seemingly in pursuit of its prey. Sometimes the wheels seem to be entire circles, armed with small teeth like those of the balance-wheel of a watch; appearing projected forwards beyond the head, and extending sideways, somewhat wider than its diameter. The teeth or cogs of these wheels seem to stand very regularly at equal distance: but the figure of them varies according to their position, the degree of their protrusion, and perhaps the will of the animal itself. They appear sometimes as minute oblong squares, rising at right angles to the periphery of a circle, like ancient battlements on a round tower; at other times they terminate in sharp points, and altogether resemble a kind of Gothic crown. They are often seen in a kind of curvular direction, all bending the same way, and seeming like so many hooks; and now and then the ends of them will be perceived to be clubbed like mallets. This figure, however, as well as the first, they assume but rarely. As the wheels are every where excessively transparent except about their circular rim or edge, where the cogs are set, it is very difficult to determine by what contrivance they are turned about. What their real figure is, though they seem exactly to resemble wheels moving round upon an axis. It is also hardly possible to be certain whether those circular bodies in which the teeth are set are of a flat form, or hollow and conical; but they seem rather to be of a conical figure. The difficulty of conceiving how an articulation could be contrived so as to cause a real rotation, has caused many people imagine that there was a deception in this case: But Mr Baker assures us, that when the wheels are fully protruded, they never fail to show all the visible marks of a regular rotation, and, in some positions, the same cogs or teeth may be traced by the eye during a complete revolution. All the actions of this creature seem to imply sagacity and quickness of sensation. At the least touch or motion in the water, they instantly draw in their wheels; and Mr Baker conjectures, that their eyes are lodged somewhere about the wheel because

(17.) **ANIMALCULES, THEORIES OF GENERATION, &c. DRAWN FROM.** Before the invention of microscopes, the doctrine of equivocal generation, both with regard to animals and plants of some kinds, was universally received: but this instrument soon convinced every intelligent person, that those plants which formerly were supposed to be produced by equivocal generation arose from seeds, and the animals, in like manner, from a male and female. But while the microscope threw light upon one part of nature, it left another involved in darkness; for the origin of the animalcula infusoria, or of the spermatic animals already mentioned, remains as yet as much unknown as that of many other kinds was, when the doctrine of equivocal generation reigned in full force. The discovery of spermatic animalcules was thought to throw some light on the mysterious affair of generation itself, and these minute creatures were imagined to be each of them individuals of the same species with the parent. Here the infinite number of these animalcules was an objection, and the difficulty remained as great as before; for, as every one of these animalcules behoved to be produced from a male and female, to explain their origin by animalcular generation in the same manner, was only explaining generation by itself. This hypothesis, therefore, having proved unsatisfactory, others have been invented. Count Buffon, particularly, hath invented one, by which he at once annihilates the whole animalcular world; and in this he hath been followed by several very ingenious philosophers. For a particular account of this, so far as it concerns generation, we must refer to that article; but as he gives such a particular account of his having examined the human semen, that we cannot doubt of his accuracy, we shall here contrast his account with that of Mr Lewenhoeck already mentioned. Having procured the seminal vessels of a man who died a violent death, he extracted all the liquor from them while they were still warm; and having examined a drop of it with a double microscope, it appeared as in Pl. XII. fig. 9. Large filaments appeared, which in some places spread out into branches, and in others intermingled with one another. These filaments clearly appeared to be agitated by an internal undulatory motion, like hollow tubes, which contained some moving substance. He saw distinctly this appearance changed for that of fig. 10. Two of these filaments, which were joined longitudinally, gradually separated from each other in the middle, alternately approaching and receding, like two tense cords fixed by the ends, and drawn asunder in the middle. These filaments were composed of globules that touched one another, and resembled a chaplet of beads. After this, he observed the filaments swelled in several places, and perceived small globular bodies issue from the swelled parts, which had a vibratory motion like a pendulum. These small bodies were attached to the filaments by small threads, which gradually lengthened as the bodies moved. At last, the small bodies detached themselves entirely from the filaments, drawing after them the small thread which looked like a tail. When a drop of the seminal liquor was diluted, these small bodies moved in all directions very

briskly; and had he not seen them separate themselves from the filaments, he would, he says, have thought them to be animals. The seminal matter was at first too thick, but gradually became more fluid; and, in proportion as its fluidity increased the filaments disappeared, but the small bodies became exceedingly numerous. Each of them had a long thread or tail attached to it, from which it evidently endeavoured to get free. Their progressive motion was extremely slow, during which they vibrated to the right and left, and at each vibration they had a rolling unsteady motion in a vertical direction. At the end of two or three hours, the seminal matter becoming still more fluid, a greater number of these moving bodies appeared. They were then more free of incumbrances; their tails were shorter; their progressive motion was more direct, and their horizontal motion greatly diminished. In five or six hours, the liquor had acquired almost all the fluidity it could acquire, without being decomposed. Most of the small bodies were now disengaged from their threads; their figure was oval. They moved forward with considerable quickness, and by their irregular motions backward and forward they had now more than ever the appearance of animals. Those that had tails adhering to them seemed to have less vivacity than the others; and of those that had no tails, some altered both their figure and their size. In twelve hours, the liquor had deposited at the bottom of the vial a kind of ash coloured gelatinous substance, and the fluid at top was almost as transparent as water. The little bodies being now entirely freed from their threads, moved with great agility, and some of them turned round their centres. They also often changed their figures, from oval becoming round, and often breaking into smaller ones. Their activity always increased as their size diminished. In a few hours, the liquor had deposited a greater quantity of gelatinous matter, which, being with some difficulty diluted in water, exhibited an appearance somewhat resembling lace. In the clear semen itself only a few small bodies were now seen moving; next day, these were still farther diminished; and after this nothing was to be seen but globules without the least appearance of motion. Most of the abovementioned appearances are shown fig. 10, 11, 12, 13, 14, 15, 16. Fig. 17. and 18. represent an appearance of the globules in another experiment, in which they arranged themselves in troops, and passed very quickly over the field of the microscope. In this experiment they were found to proceed from a small quantity of gelatinous mucilage.

(18.) **ANIMALCULES, THE REAL EXISTENCE OF, DENIED.** From the above experiments, Buffon concludes, that what have been called spermatic animals, are not creatures really endued with life, but something proper to compose a living creature; and he distinguishes them by the name of *organic particles*. The same individual kinds of animals he declares he has found in the fluids separated from the ovaria of females; and for the truth of this appeals to the testimony of Mr Needham, who was an eye witness of his experiments. He also begins an additional proof of his doctrine from Mr Needham's observations on the milt of the

succession of them afterwards coming up, they united together in little thin masses, and floated to the edge of the water, remaining there quite inactive during the time of observation. As this discovery cleared up many doubts which I had received from reading Mr Needham's learned dissertation, I put into the glass several other dead flies, by which means this species of mucor was propagated so plentifully, as to give me an opportunity of frequently trying the same experiment to my full satisfaction. Lastly, These jointed coralloid bodies, which Mr Needham calls *chaplets* and *pearl necklaces*, I have seen frequently very distinctly. These appear not only on an infusion of bruised wheat when it becomes putrid, but on most other bodies when they throw up a viscid scum and are in a state of putrefaction. These, then, are evidently no more than the most common mucor, the seeds of which are every where floating in the air; and bodies in this state afford them a natural proper soil to grow upon. Here they send downwards their fine transparent ramified roots into the moisture which they float upon; and from the upper part of the scum, their jointed coralloid branches rise full of seed into little grove-like figures. When a small portion of these branches and seeds are put into a drop of the same putrid water upon which the scum floats, many of these millions of little animalcules with which it abounds, immediately seize them as food, and turn them about with a variety of motions, as in the experiments on the seeds of the common mushrooms, either singly, or two or three sides connected together; answering exactly to Mr Needham's description, but evidently without any motion of their own, and consequently not animated." The Count de Buffon, however, is not content with denying life only to those beings where the signs of it are the most equivocal; but includes in the same rank of organic particles, almost every animal too small to be discovered by the naked eye, and even some of those whose motions are evidently perceptible to the eye. "Almost all microscopic animals," says he, "are of the same nature with the moving bodies in the seminal fluids and infusions of animal and vegetable substances. The eels in paste, in vinegar, &c. are all of the same nature, and derived from the same origin. There are, perhaps, as many beings that either live or vegetate, produced by a fortuitous assemblage or organic particles, as by a constant and successive generation. Some of them, as those of the calmar, are only a kind of machines, which, though exceedingly simple, are very active. Others, the spermatic animalcules, seem to imitate the movements of animals. Others resemble vegetables in their manner of growth and extension. There are others, as those of blighted wheat, which at pleasure can be made alternately either to live or die, and it is difficult to know to what they should be compared. There are still others, and in great numbers, which are at first a kind of animals, then become a species of vegetables, and again return alternately to their vegetable state. The eels in paste have no other origin than the union of the organic particles of the essential part of the grain. The first eels that appear are certainly not produ-

ced by other eels; but though they are not propagated themselves, they fail not to engender other living eels. By cutting them with the point of a lancet, we discover smaller eels issuing in great numbers out of their bodies. The body of this animal seems to be only a sheath or sac, containing a multitude of smaller animals, which perhaps are other sheaths of the same kind, in which the organic matter is assimilated into the form of eels."

(19.) ANIMALCULES, THE REASONING AGAINST THE EXISTENCE OF, INCONCLUSIVE.— Though we can by no means pretend to account for the appearance of these animalcules, yet we cannot help observing, that our ignorance of the cause of any phenomenon is no argument against its existence. Though we are not able to account in a satisfactory manner, for the origin of the native Americans, we suppose Buffon himself would reckon it absurd to maintain, that the Spaniards, on their arrival there, found only *organic particles* moving about in disorder. The case is the same with the eels in paste. They are exceedingly minute, in comparison with us; but, with the solar microscope, Mr Baker has made them assume a more respectable appearance, so as to have a diameter of an inch and an half, or two inches, and a length proportionable. They swarm up and down, very briskly; the motion of their intestines was plainly visible; when the water dried up, they died with apparent agonies, and their mouths gaped very wide. Were we to find a creature of the size of this magnified eel, gasping in a place where water had lately been, we certainly would never conclude it to be an *organic particle*, or a fortuitous assemblage of them, but a fish. Why then should we conclude otherwise, with regard to the eel, while in its natural state, than that it is a little fish? In reasoning on this subject, we ought always to remember, that, however essential the distinction of bodies into great and small, may appear to us, they are not so to the Deity; with whom, as Mr Baker well expresses himself, "an atom is as a world, and a world but as an atom." Were the Deity to exert his power for a little, and give a natural philosopher a view of a quantity of paste, filled with eels, from each of whose bodies the light was reflected, as when it passes through a solar microscope; instead of imagining them organic particles, the paste would appear like a little mountain, he would probably look upon the whole, as a monstrous assemblage of serpents, and be afraid to come near them. Wherever, therefore, we discover beings, to appearance, endued with the principle of self-preservation, or whatever else we make the characteristic of animals, neither the smallness of their size, nor the impossibility of our knowing how they come there, ought to cause us doubt of their being really animated.— At the same time, it must also be remembered, that *motion* is not always a characteristic of animal life, even though the moving bodies should avoid one another, or any seeming obstacle placed in their way. We know, that inanimate bodies, when electrified, will avoid others, endowed with an electricity of the same kind, and adhere to those which have the opposite one. As we are by

dom and goodness in the works of the creation, the vital union of souls with matter, and the admirable structure of *animate* bodies. *Bentley.*

* *To ANIMATE.* *v. a.* [*animo*, Lat.] 1. To quicken; to make alive; to give life to: as, the soul *animates* the body; man must have been *animated* by a higher power. 2. To give powers to; to heighten the powers, or effect of any thing.—

But none, ah! none can *animate* the lyre,
And the mute strings with vocal souls inspire;
Whether the learn'd Minerva be her theme,
Or chaste Diana bathing in the stream;
None can record their heav'nly praise so well
As Helen, in whose eyes ten thousand Cupids dwell.
Dryden.

3. To encourage; to incite.—The more to *animate* the people, he stood on high, from whence he might be best heard, and cried unto them with a loud voice. *Knolles.*—He was *animated* to expect the papacy, by the prediction of a soothsayer, that one should succeed Pope Leo, whose name should be Adrian. *Bacon.*

(1.) * *ANIMATED.* *participial adj.* [from *animate*.] Lively; vigorous.

Warriours she fires with *animated* sounds;
Pours balm into the bleeding lover's wounds.
Pope.

(2.) *ANIMATED* also denotes a thing impregnated with vermin or animalcules. In this sense, the whole earth seems to be animated; for, in every part of it, we meet with an infinite number of animals, either visible or invisible; they are found in air, water, earth, plants, and even in the hardest stones: and there is perhaps no animal known, which does not breed numbers of others, in the different parts of its body.

ANIMATED HORSE HAIRS. See *HORSE HAIRS.*

ANIMATED MERCURY, among chemists, quicksilver, impregnated with some subtle and spiritous particles, so as to render it capable of growing hot, when mingled with gold.

ANIMATED NEEDLE, a needle touched with the load stone.

* *ANIMATENESS.* *n. f.* [from *animate*.] The state of being animated. *DiB.*

(1.) * *ANIMATION.* *n. f.* [from *animate*.] 1. The act of animating or enlivening.—Plants or vegetables are the principal part of the third day's work. They are the first *productat*, which is the word of *animation*. *Bacon.* 2. The state of being enlivened.—Two general motions in all *animation* are its beginning and encrease; and two more to run through its state and declination. *Brown's Vulgar Errors.*

(2.) *ANIMATION* has been more accurately defined the informing an animal body with a soul.—The different hypotheses of physicians and philosophers, concerning the time of animation, have had their influence on the penal laws made against artificial abortions; it having been made capital to procure miscarriage in the one state, while in the other it was only deemed a venial crime. Charles V. by a constitution published in 1532, put the matter on another footing; instead of the distinction of an animated and unanimated foetus, he introduced that of a vital and non-vital foetus, as a thing of more obvious and easy decision, and

not depending on any system either of creation, traduction, or infusion. Accordingly a foetus is said, in a legal sense, to be animated, when it is perceived to stir in the womb; which usually happens about the middle of the term of gestation, although it often happens earlier.

(3.) *ANIMATION*, in alchemy, is the operation of fermenting a white foliated earth, with a kind of philosophical or celestial water or sulphur. It is also used by hermetic philosophers, to denote a certain state of perfection to which a body is brought by some appropriate process, in virtue whereof it becomes capable of producing some extraordinary phenomena.

(4.) *ANIMATION*, in rhetoric, the act of giving life and force to a discourse.

* *ANIMATIVE.* *adj.* [from *animate*.] That which has the power of giving life, or animating.

ANIMATO, in music. See *ANIMA*, N° 3.

* *ANIMATOR.* *n. f.* [from *animate*.] That which gives life; or any thing analogous to life, as motion.—Those bodies being of a congenerous nature, do readily receive the impressions of their motor, and, if not fettered by their gravity, conform themselves to situations, wherein they best unite to their *animator*. *Brown.*

(1.) *ANIME*, a resin exuding from an incision of the trunk of a large American tree, called by Piso *jetaiba*, by the Indians *courbaril*, a species of *HYMENÆA*. This resin is of a transparent amber colour, a light agreeable smell, and little or no taste. It dissolves entirely, but not very readily, in rectified spirit of wine; the impurities, which are often in large quantity, remaining behind. The Brazilians are said to employ anime in fumigations for pains and aches proceeding from a cold cause: with us, it is rarely, if ever, made use of for any medicinal purposes. There are two species of it, viz.

1. *ANIME, EASTERN*, is distinguished into three kinds; the first is white; the second blackish, and smells like myrrh: the third pale, resinous, and dry.

2. *ANIME, WESTERN*, flows from an incision of a tree in New Spain, called *courbaril*; it is transparent, and of a colour like that of frankincense; its smell is very agreeable, and it easily consumes in the fire.

(II.) *ANIMA*, in heraldry, a French term used when the eyes of a rapacious creature are born of a different tincture from the creature itself. The English term is *incensed*.

ANIMELLÆ, the glands under the ears, &c. called also *lacticea*.

ANIMETTA, in ecclesiastical writers, the cloth, wherewith the cup is covered in the eucharist.

ANIMI DELIQUIM, swooning. See *LYPOTHYMIA*.

ANIMODAR, in astrology, the method of rectifying nativities.

* *ANIMOSE.* *adj.* [*animositas*, Lat.] Full of spirit; hot; vehement. *DiB.*

* *ANIMOSENESS.* *n. f.* [from *animose*.] Spirit; heat, vehemence of temper. *DiB.*

* *ANIMOSITY.* *n. f.* [*animositas*, Lat.] Vehemence of hatred; passionate malignity. It implies rather the disposition to break out into outrage, than

not depending on any other external condition, or infusion. Accidents are said, in a legal sense, to be accidents perceived to stir in the world, and to happen about the middle of the conversation, although it often happens earlier.

ANIMATOR, in anatomy, is the part of the brain which is the seat of the philosophical or critical faculties, and is also used by domestic physicians as a certain state of perfusion to excite the brain, by some appropriate power, whereof it becomes capable of producing extraordinary phenomena.

ANIMATOR, in metaphysics, is the life and force to a discourse.

ANIMATIVE, in metaphysics, is the power of giving animation.

ANIMATO, in metaphysics, is the power of giving animation.

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that the outrage itself.—They were sure to bring pain, sorrow, and miserie enough of their own, what evidence forever they had from others.

ANIMATOR—It there is not some method found out to supply these wants and answer the desires, one does not know to what extent they may proceed.

ANIMATOR—No religious feel per caused their attention for each others to greater lights than our late parties have done; the more to inflame their passions, have kind religious and civil animosities together; leaving one of their appellations from the other.

ANIMUS, the mind, as expressing the rational faculty, in distinction from **ANIMA**, the soul, spiritual faculty resides.

ANIMUS, in metaphysics, is the power of giving animation.

ANIMATOR, in metaphysics, is the power of giving animation.

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ANISCALPTOR, in anatomy, a muscle of the throat, called *larynx* and *dog*.

ANISE, *n.* *aniseum*, Lat.] A species of apian, a parsley, with large sweet scented herbs. — The plant is not worth propagating in England for any, because the seeds can be had much better and cheaper from Italy. *Anise*.—Ye pay the tax to him, and anise, and cummin, and have omitted the weightier matters of the law, judgment, mercy, and faith: this ought ye to have done, and not to leave the other undone. *Matth. xxiii. 23.*

ANISEED, a medicinal seed, produced by the plant anise, and containing an essential oil. — *Cammat* is, expelling wind out of the stomach and bowels, both given at the mouth, and in dysentery. It is useful against cold affections of the lungs, difficulty of breathing, and asthma. Some recommend it to be taken frequently by nurses to increase their milk. It is often used as a counteract of the flatterer purgative. The oil distilled from it is used for the same purposes, and is often applied outwardly in carminative and anodyne liniments; particularly for the pleura, and other parts in the side. See *g*.

ANISEED, *STYACIA*, *anisan fistulatum*, is a seed brought chiefly from Tartary, thus called from the affinity it bears in smell to the common aniseed, and the star like figure of its *capsula* *foveolata*. It was brought into Europe from the Philippines by one of an English manner, named Thomas Cundy, in his return from a voyage round the world in 1681. The natives call it *anise* and *anise*, the Europeans *foveolata* *anise*, or *Chama* *anise*. Its virtues are the same with those of the common aniseed, only that it is sweeter and more grateful. It is reputed a general cordial and strengthener. The Dutch and the Chinese use it in the preparation of their tea. In a chalybeate aniseed feed for the oil, there is procured a liquid water, called aniseed water; which has much the same virtue with the oil.

ANISUM, anise. See *Anise*, *g*, *h*, *i*, *j*, and *Prescrip.*

ANKER, *n.* *anker*, Dut.] A liquid measure chiefly used at Amsterdam. It is the fourth part of the awm, and contains two hekenes; each heken consists of sixteen menges, the meng being equal to two of our wine quarts. *Chamb.*

ANKER, in English measure, contains about 32 gallons.

ANKER, in geography, a river in Warwickshire, which falls into the Tamise at Tamworth.

ANKERDEN, a village in Wiltshire, on the borders of H. retordshire.

ANKERTON, a small town in Oxfordshire, N. W. of Banbury.

ANKERWICK, a village in Buckinghamshire, on the Thames.

ANKER, a river of Lincolnshire, which falls into the Humber.

ANKER, *London*, Sax. *ancker*, Dutch.] The joint which joins the foot to the leg.—One of his *ankles* was much swelled and ulcerated on the inside, in several places. *Historia.*

My simple (yrem shall suppo,

That Anna enters at the toes;

That then she mounts by just degrees

Up to the *ankles*, legs and knees. *Prior.*

(2.) * **ANKLE-BONE.** *n. f.* [from *ankle* and *bone*.]

The bone of the ankle.—The shin-bone, from the knee to the instep, is made by shadowing one half of the leg with a single shadow, the *ankle-bone* will shew itself by a shadow given underneath, as the knee. *Peacbam.*

(3.) **ANKLE, LUXATIONS, &c. OF THE.** The ankle is subject to be luxated, either in running, in jumping, or even in walking; and that in all four directions, either inward or outward, backward or forward. When the ankle is luxated inward, the bottom of the foot is turned outward; and, on the contrary, when it is luxated outward, the bottom of the foot is turned inward, which latter case is indeed much more frequent than the others. If it is dislocated forward, the heel becomes shorter, and the foot longer than it should be; and if backward, the contrary signs to these will appear. The ankle, however, can scarce possibly be luxated outwards, unless the *fibula* be separated from the *tibia*, or else quite broken, which may happen to the external ankle; nor is it uncommon for a luxation of the ankle to be attended with very grievous symptoms, especially when occasioned by some great external violence. Nor can it indeed well happen otherwise in this case, since the distortion of the foot must necessarily overstrain the adjacent tendons, ligaments, and nerves, and thence excite very violent pains, and other bad symptoms: or the veins and arteries may also be very easily lacerated, which will occasion a large extravasation of blood about the whole foot, and too often give rise to a gangrene. It is however necessary to observe, that the ankle is not always luxated, after it has been violently strained by leaping, or turning the foot on one side; for it sometimes happens that the ankle is not dislocated on these occasions, but only the parts violently contused and strained. The ankle, when truly luxated, is more or less difficult to be reduced, according to the violence of the force by which the accident was occasioned. The most ready way, however, of reducing a luxation of the ankle, is to place the patient upon a bed, seat, or table, letting the leg and foot be extended in opposite directions by two assistants, while the surgeon replaces the bones with his hands and fingers in their proper situation. When the foot is by this means restored to its proper position, it is to be well bathed with oxycrate and salt, and then carefully bound up with a proper bandage. The patient must be enjoined to keep his bed for a considerable time, till the bad symptoms are gone, and the ankle has recovered its strength so far as to bear the weight of the body, without any uneasiness or danger. We have an account of the *menfes* regularly evacuated at an ulcer of the ankle, in the *Edinburgh Medical Essays*, vol. iii. art. 29.

ANKRED, in heraldry. See **ANCREE**.

ANLABY, a village in Yorkshire, near Hull.

ANLACE, a falchion, or sword shaped like a scythe.

ANN, or **ANNAT**, in Scots law, is half a year's stipend, which the law gives to the executors of ministers of the church of Scotland, over and a-

bove what was due to the minister himself, for his incumbency.

(1.) **ANNA**, [of *חנה*, Heb. gracious,] a Jewish prophetess, the daughter of Phanuel, of the tribe of Asher, who finding the virgin Mary, with her infant Son, in the temple, joined with the venerable Simeon, in thanking God for him, and bearing testimony to him, as the promised Messiah. It is worth remarking that these two early testifiers of our Saviour's mission, being both far advanced in life, could not be liable to the most distant suspicion of collusion with Joseph and Mary, in palming a false Messiah on their countrymen; as they had not the smallest probable chance of living to see him grow up to maturity, and fulfil their prophecies, and therefore could have no interest in declaring a falsehood.

(2.) **ANNA**, a province of Arabia Deserta, and one of the 3 principalities into which it is divided.

(3.) **ANNA**, one of the chief cities of the above principality, and formerly a famed market town, situated on the W. bank of the Euphrates, in a fruitful and pleasant soil, 130 miles W. of Bagdad, and 120 S. S. W. of Moussol. It has two streets, which are divided by the river. That on the Mesopotamia side is about two miles long, but thinly peopled, and by none but tradesmen; that on the opposite side is about six miles in length, and it is there that the principal inhabitants dwell. Every house has some ground belonging to it; and these grounds are loaded with fruit trees, bearing lemons, oranges, citron quinces, figs, dates, pomegranates, olives, &c. all very large and in great plenty. Some of the flat grounds are sown with corn and other grain, which yield likewise considerable crops. This city is the common rendezvous of all the robbers that infest the country, and from which they disperse themselves into all parts of the Desert. Here they meet to hold their grand councils, and deliberate where to rob next with success. It is with great difficulty that the Turkish aga, and the janissaries, who are kept here, can levy the tribute imposed by the Turks on all the commodities carried through this city, which is one of the great thorough-fares for the passing of the caravans to and from Aleppo, Tripoli, Damascus, Bagdad, and some other parts of the Turkish empire. Long. 41. 35. E. Lat. 33. 30. N.

(4.) **ANNA**, the daughter of Belus, king of Tyre, and sister of Dido, whom she accompanied in her flight. She was worshipped, as a goddess, by the ancient Romans, under the title of *Anna Perenna*; and sacrifices were offered to her both publicly and privately, *ut populo annare & perannare liceret*.

(5.) **ANNA**, the mother of the virgin Mary.

(6.) **ANNA COMNENA**. See **COMNENA**.

(7.) **ANNA, ST.** a Russian fortress, situated on the Don, in a marshy country. It is well built, and the streets are broad and straight.

ANNABERG, a town in Saxony, famous for its warm baths. Its silver mines were formerly very productive. Long. 13. 6. E. Lat. 53. 33. N.

ANNABON. See **ANNOBON**.

ANNACLOY, a small town of Ireland, in the county of Down, and province of Ulster, seated on a branch of Strangford Lake.

ANNACOTTY



In general, it is in greater danger of breaking from a very slight stroke than from one of some considerable force. One of those vessels will often resist the effects of a pistol-bullet dropt into it from the height of two or three feet; yet a grain of sand falling into it, will make it burst into small fragments. This takes place sometimes immediately on dropping the sand into it: but often the vessel will stand for several minutes after, seemingly secure; and then, without any new injury, it will fly to pieces. If the vessel be very thin, it does not break in this manner, but seems to possess all the properties of annealed glass. The same phenomena are still more strikingly seen in glass drops or tears. They are globular at one end, and taper to a small tail at the other. They are the drops which fall from the melted mass of glass on the rods on which the bottles are made. They drop into the tubs of water which are used in the work; the greater part of them burst immediately in the water. When those that remain entire are examined, they discover all the properties of unannealed glass in the highest degree. They will bear a smart stroke on the thick end without breaking; but if the small tail be broken, they burst into small powder with a loud explosion. They appear to burst with more violence, and the powder is smaller in an exhausted receiver than in the open air. When they are annealed, they lose those properties.—Glass is one of those bodies which increase in bulk when passing from a fluid to a solid state. When it is allowed to crystallize regularly, the particles are so arranged, that it has a fibrous texture: it is elastic, and susceptible of long continued vibrations; but when a mass of melted glass is suddenly exposed to the cold, the surface crystallizes, and forms a solid shell round the interior fluid parts: this prevents them from expanding when they become solid. They, therefore, have not the opportunity of a regular crystallization; but are compressed together with little mutual cohesion: On the contrary, they press outward to occupy more space, but are prevented by the external crust. In consequence of the effort of expansion in the internal parts, the greater number of glass drops burst in cooling; and those which remain entire are not regularly crystallized. A smart stroke upon them communicates a vibration to the whole mass, which is nearly synchronous in every part; and therefore the effort of expansion has little more effect than if the body were at rest; but the small tail and the surface only are regularly crystallized. If the tail be broken, this communicates a vibration along the crystallized surface, without reaching the internal parts. By this they are allowed some expansion; and overcoming the cohesion of the thin outer shell, they burst it and are dispersed in powder. In an unannealed glass vessel the same thing takes place. Sometimes the vibration may continue for a considerable time before the internal parts overcome the resistance. If the vessel be very thin, the regular crystallization extends through the whole thickness; or at least the quantity of compressed matter in the middle is so inconsiderable, as to be incapable of bursting the external plate.—By the process of annealing, the glass is for some time in a state approaching to fluid-

ity; the heat increases the bulk of the crystallized part, and renders it so soft, that the internal parts have the opportunity of expanding and forming regular crystallization.

(2.) ANNEALING OF IRON. A similar process is now used for rendering kettles and other vessels of cast iron less brittle: of it the same explanation may be given. The greater number of metals diminish in bulk, when they pass from a fluid to a solid state; iron, on the contrary, expands. When cast iron is broken, it has the appearance of being composed of grain: forged or bar iron appears to consist of plates. Forged iron has long been procured, by placing a mass of cast iron under large hammers, and making it undergo violent and repeated compression. A process is now used for converting cast iron into forged, by heat alone. The cast iron is placed in an air furnace, and kept for several hours in a degree of heat, by which it is brought near to a fluid state. It is then allowed to cool gradually, and is found to be converted into forged iron. This process is conducted under a patent; although, if Reaumur's experiments upon cast iron be consulted, it will appear not to be a new discovery.—By these experiments it is ascertained, that if cast iron be exposed for any length of time to a heat considerably below its melting point, the texture and properties are not changed: but if it be kept in a heat near the melting point, the surface soon becomes lamellated like forged iron; and the lamellated structure extends farther into the mass in proportion to the length of time in which it is exposed to that degree of heat. When it is continued for a sufficient time, and then allowed to cool gradually, it is found to possess the lamellated structure throughout.—Cast iron, then, is brittle, because it has not had the opportunity of crystallizing regularly. When it is exposed to cold while fluid, the surface becoming solid, prevents the inner parts from expanding and arranging themselves into regular crystals. When cast iron is brought near to the melting point, and continued for a sufficient length of time in that degree of heat, the particles have the opportunity of arranging themselves into the form of crystals by which forged iron is distinguished, and by which it possesses cohesion and all its properties.—There appears, therefore, to be no other essential difference between forged and cast iron, except what arises from the crystallization. Cast iron is indeed often not sufficiently purified from other substances which are mixed with the calx. It appears also to contain a considerable quantity of calx unreduced; for during the process for converting it into forged iron by heat alone, a pale flame rises from the metal till near the end of the process. This is owing to fixed air which the heat forces off from the calx. The expulsion of this air reduces the calx, and thereby frees the metal from that injurious mixture. That this explanation of the annealing of iron is probable, appears also from the well known fact of forged iron being incomparably more difficult of fusion than cast iron. A piece of forged iron requires a violent heat to melt it; but when it is reduced to a small powder, it melts in a much lower degree of heat. Iron diminishes in bulk when it passes into a fluid state, while most other metals increase

ANN

1 was first commissioner to Ulster, to oppose the designs of the rebel Owen Roe O'Neill. He is president of the council of state, after the death of Oliver, and was principally concerned bringing about the Restoration, soon after which, King Charles II. created him baron Annesley, and afterwards Earl of Anglesey. During that reign, he was made treasurer of the navy, and lord privy seal. In October 1680, he was charged by one Dangerfield, upon oath, at the bar of the House of Commons, with endeavouring to stifle evidence in relation to the Popish plot, and to promote the belief of a Presbyterian one. The unsuccess he received from this attack did not prevent his speaking his opinion freely in the House of Lords, in regard to the Popish plot. He also answered Lord Castlemain's Memoirs, in which that nobleman endeavoured to paint the Irish rebellion in the lightest colours, and a sharp dispute was raised, which ended in the seals being taken from him. He was a person of great abilities, had uncommon learning, and was well acquainted with the constitution and laws of England. He wrote, besides his Animadversions on Castlemain's Memoirs, 1. The Privileges of the House of Lords and Commons stated. 2. A Discourse on the House of Lords. 3. Memoirs. 4. The History of the Troubles in Ireland, from the rebellion in 1641 till the restoration. 5. Truth Unveiled, in behalf of the Church of England, and some other works. He died in 1686, aged 73.

(2) ANNEXLEY, a small town of Nottinghamshire, near Sherwood Forest.

(3) ANNEXLEY, a village in Staffordshire, one mile from the Dove.

ANNET, one of the Scilly Isles. It is uninhabited, but at low water, the foundations of ruined habitations are visible, which are supposed to have been destroyed by the sea. There are some druidical relics upon it.

* ANNEX, *v. f.* from *To annex*. The thing annexed, addition.—Failing in his first attempt to be but like the highest in heaven, he hath undertaken of men, to be the same on earth, and hath accordingly assumed the *annexes* of divinity, Brown.

* To ANNEX, *v. a.* [*annexo, annexum, Lat. annexo, Fr.*] 1. To unite to at the end; as, he annexed a codicil to his will. 2. To unite, as, a smaller thing to a greater; as, he annexed a province to his kingdom. 3. To unite a posterior annexation always presupposing something; thus we may say, punishment is annexed to guilt; but not guilt to punishment.—Concerning fate or destiny the opinions of these learned men, that have written thereof, may be safely received, had they not thereto *annexed* and fastened an inevitable necessity, and made it more general and universally powerful than it is. Raleigh.

Nations will decline to low From piety, which is reason, that so wrong, But justice, and some fatal curse annex'd, Deprives them of their outward liberty, Milton. I mean not the authority, which is annexed to your office; I speak of that only which is inborn and inherent to your person. Dryden.—He cannot but love virtue wherever it is, and *annex* happiness is always to it. Attorbury.—

The temporal reward is *annexed* to the bare performance of the action, but the eternal to the obedience. *Rogers.*

(1.) * **ANNEXATION.** *n. f.* [from *annex*] 1. Conjunction; addition.—If we can return to that charity and peaceable mindedness, which Christ so vehemently recommends to us, we have his own promise, that the whole body will be full of light; *Matt. vi.* that all other christian virtues will, by way of concomitance or *annexation*, attend them. *Hammond.* 2. Union; act or practice of adding or uniting.—How *annexations* of benefices first came into the church, whether by the prince's authority, or the pope's licence, is a very great dispute. *Ayliffe's Parergon.*

(2.) **ANNEXATION**, in law, the uniting of lands or rents to the crown.

* **ANNEXION.** *n. f.* [from *annex*.] The act of annexing; addition.—It is necessary to engage the fears of men, by the *annexion* of such penalties as will overbalance temporal pleasure. *Rogers.*

* **ANNEXMENT.** *n. f.* [from *annex*.] 1. The act of annexing. 2. The thing annexed.—

When it falls,

Each small *annexment*, petty consequence,
Attends the boist'rous ruin. *Shakespeare.*

ANN-GROVE, a village in Cork.

ANNIBAL. See **HANNIBAL.**

ANNIENTED. See **ANIENED.**

* **ANNIHILABLE.** *adj.* [from *annihilate*.] That which may be reduced to nothing; that which may be put out of existence.

* **To ANNIHILATE.** *v. a.* [*ad* and *nihilum*, Lat.] 1. To reduce to nothing; to put out of existence.—It is impossible for any body to be utterly *annihilated*; but that as it was the work of the omnipotency of God, to make somewhat of nothing; so it requireth the like omnipotency to turn somewhat into nothing. *Bacon.*

Thou taught'st me, by making me
Love her, who doth neglect both me and thee,
T'invent and practise this one way, t'*annihilate*
all three. *Donne.*

He despaired of God's mercy; he, by a decollation of all hope, *annihilated* his mercy. *Brown's Vulgar Errors.*—Whose friendship can stand against assaults; strong enough to *annihilate* the friendships of puny minds; such an one has reached true constancy. *South.*—Some imagined water sufficient to a deluge was created, and, when the business was done, disbanded, and *annihilated*. *Woodward.*—2. To destroy, so as to make the thing otherwise than it was.—The flood that hath altered, deformed, or rather *annihilated* this place; so as no man can find any mark or memory thereof. *Raleigh.* 3. To annul; to destroy the agency of any thing.—There is no reason, that any one commonwealth should *annihilate* that whereupon the whole world has agreed. *Hooker.*

(1.) * **ANNIHILATION.** *n. f.* [from *annihilate*.] The act of reducing to nothing. The state of being reduced to nothing.—God hath his influence into the very essence of things, without which their utter *annihilation* could not choose but follow. *Hooker.*

That knowledge, which as spirits we obtain,
Is to be valu'd in the midst of pain;

Annihilation were to lose heav'n more:

We are not quite exil'd, where thought can
soar. *Dryden.*

(2.) **ANNIHILATION DIFFERENT OPINIONS CONCERNING.** Christians, Heathens, Jews, Siamese, Persians, divines, philosophers, &c. have their peculiar systems, sentiments, conjectures, not to say *dreams*, concerning annihilation; and we find great disputes among them about the reality, the possibility, the means, measures, prevention, ends, &c. of annihilation. The first notions of the production of a thing from, or reduction of it to, nothing, Dr Burnet shows, arose from the Christian theology; the words *creation* and *annihilation*; in the sense now given to them, having been equally unknown to the Hebrews, the Greeks, and the Latins. The ancient philosophers in effect denied all annihilation as well as creation, resolving all the changes in the world into new modifications, without supposing the production of any thing new, or destruction of the old. By daily experience, they saw compounds dissolved; and that in their dissolution nothing perished but their union or connection of parts: when in death the body and soul were separated, the man they held was gone, but that the spirit remained in its original the great soul of the world, and the body in its earth from whence it came; these were again wrought by nature into new compositions, and entered new states of being which had no relation to the former. The Persian bramins hold; that after a certain period of time, consisting of 71 joogs, God not only annihilates the whole universe, but every thing else; angels, souls, spirits, and all, by which he returns to the same state he was in before the creation; but that, having breathed a while, he goes to work again, and a new creation arises, to subsist 71 joogs more, and then to be annihilated in its turn. Thus they hold there have been almost an infinite number of worlds: but how many joogs are elapsed since the last creation, they cannot certainly tell; only in an almanac written in the Sanscrit language in 1670, the world is said to be then 3,892,771 years old from the last creation. The Talapoins hold it the supreme degree of happiness to have the soul totally annihilated; and freed from the burden and slavery of transmigrations. They speak of three Talapoins who, after a great number of transmigrations, became gods; and when arrived at this state, procured this further reward of their merit to be annihilated! The ultimate reward of the highest perfection man can arrive at is *niurepan*, or annihilation; which at length is granted to those who are perfectly pure and good, after their soul have wandered many thousand years through various bodies! The Siamese heaven is exactly the hell of some Socinians and other Christian writers who, shocked with the horrible prospect of eternal torments, have taken refuge in the system of annihilation. This system seems countenanced by Scripture; for the words *death*, *destruction*, and *perishing*, whereby the punishment of the wicked is most frequently expressed in Scripture, do most properly import annihilation and an utter end of being. To this Tillotson answers, that these words, as well as those corresponding to them in other

other languages, are often used, both in Scripture and other writings, to signify a state of great misery and suffering, without the utter extinction of the miserable. Thus God is often said in Scripture to bring *destruction* on a nation, when he sends judgments upon them, but without exterminating or making an end of them. So, in other languages, it is frequent, by *perishing*, to express a person's being made miserable; as in that famous passage in Tiberius's letter to the Roman senate: *Ita me dii, deæque omnes, pejus perdant, quam si me perire me sentio*. As to the word *death*, a state of misery which is as bad or worse than *death* may properly enough be called by that name; and thus the punishment of wicked men after the day of judgment is in the book of Revelations frequently called the *second death*.

ANNIHILATION, OPINIONS OF CHRISTIANS RESPECTING. Some Christian writers allow a short time of the most terrible torments of sinners; and after that suppose that there shall be an utter end of their being. Of this opinion Irenæus appears to have been; who, according to M. du Pin, taught that the souls, at least of the wicked, would not subsist eternally; but that, after having undergone their torments for a certain period, they would at last cease to be at all. But Clement, Petit, Didier, and others, endeavour to defend Irenæus from this imputation, as being *unfavourable* to the wicked. It has been much debated among divines, whether, at the consummation of all things, this *earth* is to be annihilated, or only purified, and fitted for the habitation of some new order of beings. Gerard in his *Common Places*, and Hakewil in his *Apology*, contend earnestly for a total abolition or annihilation. Ray, Calmet, and others, think the system of renovation or restitution more probable, and more consonant to Scripture, reason, and infinite mercy. The fathers who have treated on the question are divided; some holding that the universe will not be annihilated, but only its exterior be changed; others asserting, that the substance of it shall be destroyed. The sentiments of mankind have differed very widely as to the possibility and impossibility of annihilation! According to some, nothing so difficult; it requires the infinite power of the Creator to effect it: some go further, and seem to put it out of the power of God himself! According to others, there is nothing so easy: Existence is a state of violence; all things are continually endeavouring to return to their primitive nothing: it requires no power at all; it will do of itself; nay, what is more, it requires an infinite power to prevent it. Many authors consider preservation as a continual reproduction of a thing, which, subsisting no longer of itself, would every moment return into nothing. Gassendi on the contrary asserts, that the world may indeed be annihilated by the same power which first created it, but that to continue it there is no occasion for any power of preservation. Some divines, of which number the learned Bishop King seems to be, hold annihilation for the greatest of all evils, worse than even the utter torments of hell flames; while others, with some of the eastern philosophers, take annihilation for the ultimate pitch of happiness human nature

is capable of; that sovereign good, that absolute beatitude, so long vainly sought for by the philosophers! No wonder it had been so long concealed; for who would have thought of looking for the *summum bonum*, where others have placed the sum of misery? The said prelate proposes it as a question, Whether suffering eternal torments be a greater evil than not existing? He thinks it highly probable, that the damned will be such fools, that, feeling their own misery in the most exquisite degree, they will rather applaud their own conduct, and choose to be, and to be what they are, rather than not to be at all; fond of their condition, however wretched, like people enraged, they will persist in their former sentiments without opening their eyes to their folly, and persevere by way of indignation and revenge. Mr Bayle refutes him on this head; but might, one would think, have saved himself the trouble.

ANNI NUBILES, *i. e.* marriageable years, in law, denotes the marriageable age of a woman, viz. after she has arrived at twelve.

ANNIS COMMUNIBUS. See **COMMUNIBUS**.

ANNISEED. See **ANISE SEED**.

ANNISOR, a river in Pembrokeshire.

(1.) * **ANNIVERSARY.** *adj.* [*anniversarius*, Lat.] Returning with the revolution of the year; annual; yearly.—The heaven whirled about with admirable celerity, most constantly finishing its *anniversary* vicissitudes. *Ray*.—They deny giving any worship to a creature, as inconsistent with christianity; but confess the honour and esteem for the martyrs, which they expressed by keeping their *anniversary* days, and recommending their example. *Stillingfleet*.

(2.) * **ANNIVERSARY.** *n. s.* [*anniversarius*, Lat.] 1. A day celebrated as it returns in the course of the year.—For encouragement to follow the example of martyrs, the primitive christians met at the places of their martyrdom, to praise God for them, and to observe the *anniversary* of their sufferings. *Stillingfleet*. 2. The act of celebration, or performance, in honour of the anniversary day.—Donne had never seen Mrs Drury, whom he has made immortal in his admirable *anniversaries*. *Dryden*. 3. *Anniversary* is an office in the Romish church, celebrated not only once a year, but which ought to be said daily through the year, for the soul of the deceased. *Ayliffe's Parergon*.

ANN-LITTLE, a small town in Hampshire, near Wherfel.

ANNOBON, a small island of Africa, on the coast of Loango, belonging to the Portuguese; so called from its being discovered on New-year's day. According to Pyrard, it is about five or six French leagues in compass; but Bandrand says, it is ten leagues round. Here are two high mountains, the tops of which being continually covered with clouds, occasion frequent rains. On the S. E. of the island are two rocks; one of which is low, and upon a level with the surface of the sea; the other higher and larger, but both dangerous in the night to shipping; but between them the channel is deep and clear. These rocks are inhabited by vast numbers of birds, so tame, that the sailors frequently catch them with their hands. On the same side of the island is a convenient

venient watering place at the foot of a rivulet, which tumbles from the mountains down to a valley covered with orange and citron trees, &c. and affording a pleasant and refreshing shade; but the road on the N. W. side is difficult and dangerous, though most frequented by ships who have no intention of touching upon the continent. In either place it is difficult to take in a sufficient quantity of water, on account of the violent breakings of the sea, and a stone intrenchment erected by the negroes, from which they annoy all strangers that attempt to land. The best road for shipping lies on the N. E. side, where they may anchor in 7, 10, 13, or 16 fathoms, on a fine sand close to the land, opposite to the village where the negroes have thrown up their intrenchments. The climate is wholesome, and the air clear and serene for the greatest part of the year. Every part of the island is watered by pleasant brooks, and fresh water springs, which, however, at the new and full moons, or in all high tides, acquire a brackishness. The banks of every rivulet are covered with palms, whence the inhabitants extract their wine by incision. Here are a number of fertile valleys, which produce Turkey corn, rice, millet, yams, potatoes, &c. and afford pasture for abundance of oxen, sheep, goats, &c. Poultry and fish also abound here; but the only mercantile production is cotton, which is esteemed equal in quality to any produced in India, though the quantity is small. In 1605, the Dutch admiral Matelief found 200 negroes, and two Portuguese, on Annobon, most of them able to bear arms, expert in the use of them, and trained up in military discipline. La Croix says, it has a town opposite to the road that contains above 100 houses, the whole surrounded by a parapet. Most of their dwellings are cane huts. In the whole island there is not a single house built of stone, and only two of wood, which belong to the Portuguese. All the inhabitants are meanly clothed; the women go bare-headed, and have also the upper part of the body naked, modesty being defended by a piece of linen wrapt under their stomach, and falling down in the form of a petticoat, or wide apron, to the knees. The men wear only a linen girdle round the loins, with a small flap before. The women carry their children on their backs, and suckle them over the shoulder. All the inhabitants are subject to the Portuguese governor, who is the chief person in the island. The negroes have their own chief, subordinate to him. They are all rigid catholics, having being either compelled or persuaded by the Portuguese to embrace that faith; and, like all other converts, they are bigotted in proportion to the novelty of the belief, and their ignorance of the true tenets. Long. 5. 10. E. Lat. 1. 50. S.

* **ANNO DOMINI.** [Lat.] In the year of our Lord; as, *anno domini*, or *A. D.* 1751; that is, in the seventeen hundred and fifty-first year from the birth of our Saviour.

ANNOCK, a small river in Ayrshire, which separates the united parishes of Dreghorn and Perriestown, from those of Irvine and Stewarttown.

* **ANNOISANCE.** *n. s.* [from *annoy*, but not now used.]—It hath a double signification. Any hurt either to a publick place, as highway, bridge,

or common river, or to a private, by laying any thing that may breed infection, by encroaching, or such like means. The writ that is brought upon this transgression. See **NUSANCE**, the word now used. *Biomet.*

* **ANNOLIS.** *n. s.* An American animal, like a lizard.

ANNOMÆANS. See **ANOMÆANS.**

ANNOMINATION, in rhetoric, the same with what is otherwise called *paronomasia*. See **PARONOMASIA**.

(I.) **ANNONA**, in antiquity, denotes provision for a year of all sorts, as of flesh, wine, &c. but especially of corn. *Annona* is likewise the allowance of oil, salt, bread, flesh, corn, wine, hay, and straw, which was annually provided by the contractors for the maintenance of an army.

(II.) **ANNONA**, in botany, the **CUSTARD APPLE**. A genus of the polygynia order, belonging to the polyandria class of plants; and in the natural method ranking under the 52d order, **Coccoloba**. The characters are: The calyx is a trifid perianthium: The corolla consists of six heart-shaped petals: The stamina have scarcely any filaments; the antheræ are numerous, sitting on the receptaculum: The pistillum has a roundish germen; no styli; the stigmata obtuse and numerous: The pericarpium is a large roundish unilocular berry, covered with a scaly bark: The seeds are numerous. There are 8 species; viz.

1. **ANNONA AFRICANA** is not particularly described by botanists, so far as we have seen, excepting that it produces a smooth bluish kind of apples.

2. **ANNONA ASIATICA** or purple apple, grows in some of the French islands, as well as in Cuba, in great plenty. The trees rise to the height of 30 feet or more. The fruit is esteemed by the inhabitants of those islands, who frequently give them to sick persons.

3. **ANNONA CHERIMOLA**, is a native of Peru, where it is much cultivated for the fruit, and grows to be a very large tree well furnished with branches. The leaves are of a bright green colour, and much larger than those of any of the other sorts. The fruit is oblong, and scaly on the outside, of a dark purple colour when ripe, and the flesh is soft and sweet, intermixed with many brown seeds which are smooth and shining.

4. **ANNONA MURICATA**, or four-lop, rarely rises above 20 feet high, but is well furnished with branches; the leaves are broad, have a smooth surface without any furrows, and are of a shining green colour: the fruit is large, of an oval shape, irregular, and pointed at the top, of a greenish yellow colour, and full of small knobs on the outside: the pulp is soft, white, and of a sour and sweet taste intermixed, having many oblong, dark coloured seeds.

5. **ANNONA PALUSTRIS**, or water apple, grows to the height of 30 or 40 feet. The leaves are oblong, pointed, with some slender furrows, and have a strong scent when rubbed; the fruit is seldom eaten but by negroes. The tree grows in moist places in all the West-India islands.

6. **ANNONA RETICULATA**, or custard apple, is a native of the West Indies, where it grows to the height of 25 feet, and is well furnished with branches.

* **ANNOYANCE.** *n. f.* [from *annoy.*] 1. That which annoys; that which hurts.

A grain, a dust, a gnat, a wand'ring hair,

Any *annoyance* in that precious sense. *Shakesp.*

Crows, ravens, rooks, and magpies, are great *annoyances* to corn. *Mortimer.* 2. The state of being annoyed; or act of annoying.—The spit venom of their poisoned hearts breaketh out to the *annoyance* of others. *Hooker.*—The greatest *annoyance*, and disturbance of mankind, has been from one of those two things, force or fraud. *South.*—For the further *annoyance* and terroure of any beleaged place, they would throw into it dead bodies. *Wilkins.*

* **ANNOYER.** *n. f.* [from *To annoy.*] The person that annoys.

* **ANNUAL.** *adj.* [*annuel* Fr. from *annus*, Lat.] 1. That which comes yearly.

Annual for me, the grape, the rose renew,
The juice nectareous, and the balmy dew.

Pope.

2. That which is reckoned by the year.—

The king's majesty

Does purpose honour to you; to which

A thousand pounds a year, *annual* support,

Out of his grace he adds. *Shakesp. Henry VIII.*

3. That which lasts only a year.—The dying in the winter of the roots of plants that are *annual*, seemeth to be caused by the over-expendence of the sap; which being prevented, they will superannuate, if they stand warm. *Bacon.*—Every tree may, in some sense, be said to be an *annual* plant, both leaf, flower, and fruit, proceeding from the coat that was superinduced over the wood the last year. *Ray.*

ANNUAL EPACTS. See **EPACT.**

ANNUAL EQUATION. See **EQUATION.**

ANNUAL LEAVES, as distinguished from *evergreens*, are such as come up aires in the spring, and perish in winter.

ANNUAL MOTION OF THE EARTH. See **ASTRONOMY.**

ANNUAL PLANTS, or simply **ANNUALS**, are such as only come up in spring, and die in autumn; and therefore must be renewed every year.

ANNUAL RENT is used, in Scots law, to denote the interest due by a debtor in a sum of money to a creditor for the use of it.

ANNUAL RENT, RIGHT OF, in Scots law, the original method of burdening lands with an yearly payment for the loan of money, before the taking of interest for money was allowed by statute.

ANNUALIA, 1. yearly oblations anciently made by the relations of deceased persons on the day of their death, and on which mass was celebrated with great solemnity: 2. the priests' salary for celebrating mass annually.

* **ANNUALLY.** *adv.* [from *annual.*] Yearly every year.—By two drachms, they thought sufficient to signify a heart; because the heart in one year weigheth two drachms, that is, a quarter of an ounce; and unto fifty years *annually* increaseth the weight of one drachm. *Brown's Vulgar Errors.*—The whole strength of a nation is the utmost that a prince can raise *annually* from his subjects. *Swift.*

ANNUA PENSIONE, a writ formerly issued from the king to an abbot or prior, demanding an annual pension due for his chaplains.

ANNUEL OF NORWAY, of which mention is made in the acts of parliament of King James II. was an annual payment of 100 marks Sterling which the kings of Scotland were obliged to pay to the kings of Norway, in satisfaction for some pretensions which the latter had to the Scottish kingdom, by virtue of a conveyance made there of by Malcolm Canmore. This annuel was first established in 1266; in consideration whereof the Norwegians renounced all title to the succession of the isles of Scotland. It was paid till the year 1468, when the annuel, with all its arrears, was renounced in the contract of marriage between king James III. and Margaret daughter of Christian I. king of Norway, Denmark, and Sweden.

ANNUENTES MUSCULI, [from *annuere*, to nod,] in anatomy, a pair of transverse muscles at the root of the vertebræ of the back, called *musculi recti interni minores*.

* **ANNUITANT.** *n. f.* [from *annuity.*] He that possesses or receives an annuity.

A N N U I T I E S.

INTRODUCTION.

ALTHOUGH ANNUITIES, in strict propriety of language, cannot be denominated a **SCIENCE**, being only a branch of practical arithmetic, or rather of algebra, founded upon probabilities drawn from facts, yet as the subject is acknowledged to be of no small importance, in the present state of society, and has accordingly employed the pens of many eminent calculators, we think it proper, not only to treat it scientifically, but to insert it in the form of a separate branch of science.

DEFINITION and DIVISIONS of ANNUITIES.

ANNUITIES imply any periodical income, arising from money lent, or from houses, lands, salaries, pensions, &c. payable from time to time,

either annually, or at other intervals of time.—Annuities may be divided into such as are **CERTAIN**, and such as depend on some **CONTINGENCY**, as the continuance of a life, &c. Annuities are also divided into annuities in **POSSESSION** and annuities in **REVERSION**; the former meaning such as have commenced; and the latter such as will not commence till some particular event has happened, or till some given period of time has elapsed. Annuities may be farther considered as payable either *yearly*, or *half yearly*, or *quarterly*, &c.

ANNUITIES may be supposed to be improved either in the way of simple, or compound interest. The last of these hypotheses, being the most equitable, both for seller and buyer, is commonly assumed.

SECT. I. ANNUITIES CERTAIN.

THE PRESENT VALUE of an annuity, is that sum, which, being improved at interest, will be sufficient to pay the annuity. The *present value of an annuity certain*, payable yearly, is calculated in the following manner. Let the annuity be 1, and let r denote the amount of 1 l. for a year, and 1 l. increased by its interest for one year. Then, 1 being the present value of the sum r , and having to find the present value of the sum 1, it will be, by proportion thus, $r : 1 :: 1 : \frac{1}{r}$ the present

value of 1 l. due a year hence. In like manner, $\frac{1}{r^2}$ will be the present value of 1 l. due two years

hence; for $r : 1 :: \frac{1}{r} : \frac{1}{r^2}$. In like manner, $\frac{1}{r^3}$

$\frac{1}{r^4}$, &c. will be the present value of 1 l. due at the end of 3, 4, 5, &c. years respectively; and

in general, $\frac{1}{r^n}$ will be the value of 1 l. to be received after the expiration of n years. Conse-

quently the sum of all these, or $\frac{1}{r} + \frac{1}{r^2} + \frac{1}{r^3}$

$+\frac{1}{r^4} + \&c.$ continued to n terms, will be the present value of all the n years annuities. And the value of the perpetuity, is the sum of the series continued *ad infinitum*.

But this series, it is evident, is a geometrical progression, whose first term and common ratio

are each $\frac{1}{r}$, and the number of its terms n ; and

therefore the sum s of all the terms, or the present value of all the annual payments, will be s

$$= \frac{1}{r-1} - \frac{1}{r-1} \times \frac{1}{r^n}.$$

When the annuity is a perpetuity, it is plain, that the last term $\frac{1}{r^n}$ vanishes; and therefore

$\frac{1}{r-1} \times \frac{1}{r^n}$ also vanishes; and consequently the

expression becomes barely $s = \frac{1}{r-1}$; that is,

an annuity divided by the interest of 1 l. for one year, is the value of the perpetuity.

If the annuity is not to be entered on immediately, but after a certain number of years, as m years; then the present value of the reversion is equal to the difference between two present values, the one for the first term of m years, and the other for the end of the last term n : that is,

VOL. II. PART I.

equal to the difference between $\frac{1}{r-1} - \frac{1}{r-1}$

$\times \frac{1}{r^n}$ and $\frac{1}{r-1} - \frac{1}{r-1} \times \frac{1}{r^m}$, or $= \frac{1}{r-1}$

$\times \left(\frac{1}{r^m} - \frac{1}{r^n} \right)$. Hence also the present worth of

a perpetuity in reversion, of 1 l. to commence af-

ter m years, is, $\frac{1}{r-1} \times \frac{1}{r^m}$

Annuities certain differ in value, as they are made payable *yearly, half-yearly, or quarterly*.—

And by proceeding as above, using the interest or amount of a half year, or a quarter, as those for the whole year were used, the following set of theorems will arise; where r denotes, as before, the amount of 1 l. and its interest for a year, and n the number of years, during which any annuity is to be paid; also P denotes the perpetuity

$\frac{1}{r-1}$, Y denotes $\frac{1}{r-1} - \frac{1}{r-1} \times \frac{1}{r^n}$ the

value of the annuity supposed payable yearly, H the value of the same when it is payable half yearly, and Q the value when payable quarterly; or universally, M the value when it is payable every m part of a year.

$$\text{THEOR. 1. } Y = P - P \times \left(\frac{1}{r} \right)^n.$$

$$\text{THEOR. 2. } H = P - P \times \left(\frac{2}{r+1} \right)^{2n}.$$

$$\text{THEOR. 3. } Q = P - P \times \left(\frac{4}{r+3} \right)^{4n}.$$

$$\text{THEOR. 4. } M = P - P \times \left(\frac{m}{r+m-1} \right)^{mn}.$$

EXAMPLE.

Let the rate of interest be 4 per cent, and the term 5 years; and consequently $r = 1.04$, $n = 5$, $P = 25$; and also let $m = 12$, or the interest payable monthly in theorem 4: then the present value of such annuity of 1 l. a year, for 5 years, according as it is supposed payable 1 l. yearly, or 1 half of a pound every half year, or 1 fourth of a pound every quarter, or 1 twelfth of a pound every month, or 1 twelfth part of a year, will be as follows:

$$Y = 25 - 25 \times .821928 = 4.4518$$

$$H = 25 - 25 \times .820348 = 4.4913$$

$$Q = 25 - 25 \times .819543 = 4.5114$$

$$M = 25 - 25 \times .818996 = 4.5251$$

ANNUITIES may be considered as in arrears, or as forborn for any number of years; in which case each payment is to be considered as a sum put out to interest for the remainder of the term after the time it becomes due. And as 1 l. due at the end of 1 year amounts to r at the end of another year, and to r^2 at the end of the third year, and to r^3 at the end of the 4th year, and so on;

A 2

therefore

Therefore, by adding always the last year's annuity, or 1 , to the amounts of all the former years, the sum of all the annuities and their interests will be the sum of the following geometrical series, $1 + r + r^2 + r^3 + r^4 + \dots$ to r^{n-1} , continued till the last term be r^{n-1} , or till the number of terms be n , the number of years the annuity is forborn. But the sum of this geometrical pro-

gression is $\frac{r^n - 1}{r - 1}$ which therefore is the amount of 1 l. annuity forborn for n years. And this quantity being multiplied by any other annuity a , instead of 1 , will produce the amount of that other annuity.

TABLE I.						
AMOUNT of an ANNUITY of 1 l. at COMPOUND INTEREST.						
Yrs	at 3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.
1	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
2	2.03000	2.03500	2.04000	2.04500	2.05000	2.06000
3	3.09090	3.10623	3.12160	3.13703	3.15250	3.18360
4	4.18363	4.21494	4.24646	4.27819	4.31013	4.37462
5	5.30914	5.36247	5.41632	5.47071	5.52563	5.63709
6	6.46841	6.55015	6.63298	6.71689	6.80191	6.97532
7	7.66246	7.77941	7.89829	8.01915	8.14201	8.39384
8	8.89234	9.05169	9.21423	9.38061	9.54911	9.89747
9	10.15911	10.36850	10.58280	10.80211	11.02656	11.49132
10	11.46388	11.73139	12.00611	12.28821	12.57789	13.18079
11	12.80780	13.14199	13.48635	13.84118	14.20679	14.97164
12	14.19203	14.60196	15.02581	15.46403	15.91713	16.86994
13	15.61779	16.11303	16.62684	17.15991	17.71298	18.88214
14	17.08632	17.67699	18.29191	18.93211	19.59863	21.01507
15	18.59891	19.29568	20.02359	20.78405	21.57856	23.27597
16	20.15688	20.97103	21.82453	22.71934	23.65749	25.67253
17	21.76159	22.70502	23.69751	24.74171	25.84037	28.21288
18	23.41444	24.49969	25.64541	26.85508	28.13138	30.90565
19	25.11687	26.35718	27.67123	29.06356	30.53900	33.75999
20	26.87037	28.27968	29.77808	31.37143	33.06595	36.78559
21	28.67649	30.26947	31.96920	33.78314	35.71925	39.99273
22	30.53678	32.32890	34.24797	36.30338	38.50521	43.39229
23	32.45288	34.46041	36.61789	38.93703	41.43048	46.99583
24	34.42647	36.66653	39.08260	41.68920	44.50200	50.81558
25	36.45926	38.94986	41.64591	44.56521	47.72710	54.86451
26	38.55304	41.31310	44.31174	47.57064	51.11345	59.15638
27	40.70963	43.75906	47.08421	50.71132	54.66913	63.70577
28	42.93092	46.29063	49.96758	53.99333	58.40258	68.52811
29	45.21885	48.91080	52.96629	57.42303	62.32271	73.63980
30	47.57542	51.62268	56.08494	61.00707	66.43885	79.05819
31	50.00268	54.42947	59.32834	64.75239	70.76079	84.80168
32	52.50276	57.33450	62.70147	68.66625	75.29883	90.88978
33	55.07784	60.34121	66.20953	72.75623	80.06377	97.34316
34	57.73018	63.45315	69.85791	77.03026	85.06696	104.18375
35	60.46208	66.67401	73.65222	81.49662	90.32031	111.43478
36	63.27594	70.00760	77.59831	86.16397	95.83632	119.12087
37	66.17422	73.45787	81.70225	91.04134	101.62814	127.26812
38	69.15945	77.02889	85.97034	96.13820	107.70955	135.90421
39	72.23423	80.72491	90.40915	101.46442	114.09502	145.05846
40	75.40126	84.55028	95.02552	107.03032	120.79977	154.76197
41	78.66330	88.50954	99.82654	112.84669	127.83976	165.04768
42	82.02320	92.60737	104.81960	118.92479	135.23175	175.95054

Yrs.	at 3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.
43	85.48389	96.84863	110.01238	125.27640	142.99334	187.50758
44	89.04841	101.23833	115.41288	131.91384	151.14301	199.75803
45	92.71986	105.78167	121.02939	138.84997	159.70016	212.74351
46	96.50146	110.48403	126.87057	146.09821	168.68516	226.50812
47	100.39650	115.35097	132.94539	153.67263	178.11942	241.09861
48	104.40840	120.38826	139.26321	161.58790	188.02539	256.56453
49	108.54065	125.60185	145.93373	169.85936	198.42666	272.95840
50	112.79687	130.99791	152.66708	178.50303	209.34800	290.33590
51	117.18077	136.58284	159.77377	187.53566	220.81540	308.75606
52	121.69620	142.36324	167.16472	196.97477	232.85617	328.28142
53	126.34708	148.34595	174.85131	206.83863	245.49897	348.97831
54	131.13750	154.53806	182.84536	217.14637	258.77392	370.91701

TABLE II.						
The PRESENT VALUE of an ANNUITY of 1l.						
Yrs.	at 3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.
1	0.97087	0.96618	0.96154	0.95694	0.95238	0.94340
2	1.91347	1.89909	1.88610	1.87267	1.85941	1.83339
3	2.82861	2.80164	2.77059	2.74896	2.72525	2.67301
4	3.71710	3.67308	3.62990	3.58753	3.54595	3.46511
5	4.57971	4.51505	4.45182	4.38998	4.32948	4.21236
6	5.41719	5.32855	5.24214	5.15787	5.07569	4.91732
7	6.23028	6.11458	6.00205	5.89270	5.78637	5.58238
8	7.01969	6.87390	6.73274	6.59589	6.46321	6.20979
9	7.78611	7.60769	7.43533	7.26879	7.10782	6.80169
10	8.53020	8.31661	8.11090	7.91271	7.72173	7.36009
11	9.25262	9.00155	8.76048	8.52892	8.30541	7.88687
12	9.95400	9.66333	9.38507	9.11858	8.86325	8.38384
13	10.63496	10.30274	9.98565	9.68285	9.39357	8.85268
14	11.29607	10.93052	10.56312	10.22283	9.89864	9.29498
15	11.93794	11.51741	11.11839	10.73955	10.37966	9.71225
16	12.56110	12.09411	11.65230	11.23402	10.83777	10.10590
17	13.16612	12.65132	12.16567	11.70719	11.27407	10.47726
18	13.75351	13.18968	12.65930	12.15999	11.68959	10.82760
19	14.32380	13.70984	13.13394	12.59329	12.08532	11.15812
20	14.87747	14.21240	13.59033	13.00794	12.46221	11.46992
21	15.41502	14.69797	14.02916	13.40472	12.82115	11.79408
22	15.93692	15.16712	14.45112	13.78442	13.16309	12.04158
23	16.44361	15.62041	14.85684	14.14777	13.48857	12.30338
24	16.93554	16.05837	15.24696	14.49548	13.79864	12.55040
25	17.41315	16.48151	15.62208	14.82821	14.09394	12.78336
26	17.87683	16.89035	15.98277	15.14661	14.37519	13.00317
27	18.32703	17.28536	16.32959	15.45130	14.64303	13.21053
28	18.76411	17.66702	16.66306	15.74287	14.89813	13.40616
29	19.18845	18.03577	16.98371	16.02189	15.14107	13.59072
30	19.60044	18.39205	17.29203	16.28889	15.37245	13.76483
31	20.00043	18.73628	17.58849	16.54439	15.59281	13.92909
32	20.38877	19.06887	17.87355	16.78889	15.80268	14.08404
33	20.76579	19.39021	18.14765	17.02286	16.00255	14.23023
34	21.13184	19.70068	18.41120	17.24676	16.19290	14.36814
35	21.48722	20.00066	18.66461	17.46101	16.37419	14.49825

Yrs.	at 3 per cent.	3½ per cent.	4 per cent.	4½ per cent.	5 per cent.	6 per cent.
36	21.83225	20.29049	10.90818	17.65604	16.54685	14.62099
37	22.16724	20.57053	19.14258	17.86224	16.71129	14.7.678
38	22.49246	20.84109	19.36786	18.04999	16.86789	14.84602
39	22.80822	21.10250	19.58448	18.22966	17.01704	14.94907
40	23.11477	21.35507	19.79277	18.40158	17.15909	15.04630
41	23.41240	21.59910	19.99305	18.56611	17.29437	15.13802
42	23.70136	21.83488	20.18563	18.72355	17.42.21	15.22454
43	23.98190	22.06269	20.37079	18.87421	17.54591	15.30617
44	24.25427	22.28279	20.54884	19.01838	17.66277	15.38318
45	24.51871	22.49545	20.72004	19.15635	17.77407	15.45583
46	24.77545	22.70092	20.88465	19.28837	17.88007	15.52437
47	25.02471	22.89944	21.04294	19.41472	17.98102	15.58903
48	25.26671	23.09124	21.19513	19.53561	18.07716	15.65003
49	25.50166	23.27656	21.34147	19.65130	18.16872	15.70757
50	25.73976	23.45562	21.48218	19.76201	18.25593	15.76186
51	25.95123	23.62862	21.61749	19.86795	18.33898	15.81308
52	26.16624	23.79576	21.74758	19.96933	18.41807	15.86139
53	26.37499	23.95726	21.87267	20.06634	18.49340	15.90697
54	26.57766	24.11330	21.99296	20.15918	18.56515	15.94998

THE USE OF TABLE I.

To find the AMOUNT of an ANNUITY FORBORN any number of years. Take out the amount from the 1st table, for the proposed years and rate of interest; then multiply it by the annuity in question; and the product will be its amount for the same number of years, and rate of interest.

And the converse to find the rate or time.

EXAMP. 1. To find how much an annuity of 50l. will amount to in 20 years at 3½ per cent. compound interest.—On the line of 20 years, and in the column of 3½ per cent. stands 28.27968, which is the amount of an annuity of 1l. for the 20 years; and therefore 28.27968 multiplied by 50, gives 1413.984l. or 1413l. 19s. 8d. for the answer.

EXAMP. 2. In what time will an annuity of 20l. amount to 1000l. at 4 per cent. compound interest?—Here the amount of 1000l. divided by 20l. the annuity, gives 50, the amount of 1l. annuity for the same time and rate. Then, the nearest tabular number in the column of 4 per cent. is 49.96758, which standing on the line of 28, shews that 28 years is the answer.

EXAMP. 3. If it be required to find at what rate of interest an annuity of 20l. will amount to 1000l. forborn for 28 years. Here 1000 divided by 20 gives 50 as before. Then looking along the line of 28 years, for the nearest to this number 50, I find 49.96758 in the column of 4 per cent. which is therefore the rate of interest required.

THE USE OF TABLE II.

EXAMP. 1. To find the present value of an annuity of 50l. which is to continue 20 years, at 3½ per cent.—By the table, the present value of 1l. for the same rate and time, is 14.21240; therefore 14.21240 × 50 = 710.62l. or 710l. 12s. 4d. present value sought.

EXAMP. 2. To find the present value of an annuity of 20l. to commence 10 years hence, and

then to continue for 40 years, or to terminate 50 years hence, at 4 per cent. interest.—In such cases as this, it is plain we have to find the difference between the present values of two equal annuities, for the two given times; which therefore will be effected by subtracting the tabular value of the one term from that of the other, and multiplying by the annuity. Thus,

tabular value for 50 years 21.48218
tabular value for 10 years 8.11090

the difference 13.37128
multiplied by 20

gives . . . 267.4256

or . . . 267l. 8s. 6d. the answer.

SECT. II. CONTINGENT, or LIFE ANNUITIES.

THE value of annuities for life is determined from observations made on the bills of mortality. Dr Halley, Mr Simpson, and Mons. de Moivre, are gentlemen of distinguished merit in calculations of this kind.

Dr HALLEY had recourse to the bills of mortality at Breslaw, the capital of Silesia, as a proper standard for the other parts of Europe, being a place pretty central, at a distance from the sea, and not much crowded with traffickers or foreigners. He pitches upon 1000 persons all born in one year, and observes how many of these were alive every year, from their birth to the extinction of the last, and consequently how many died each year, as in the first of the following tables; which is well adapted to Europe in general. But in the city of London, there is observed to be a greater disparity in the births and burials than in any other place, owing probably to the vast resort of people thither, in the way of commerce, from all parts of the known world. Mr Simpson, therefore, in order to have a table particularly suited

lured to this populous city, pitches upon 1280 persons all born in the same year, and records the number remaining alive each year till none remain alive.

TABLE III.
Dr HALLEY'S TABLE on the BILLS of MORTALITY at BRESLAW.

A.	Perf. c.	A.	Perf. liv.	A.	Perf. liv.	A.	Perf. liv.
1	1000	24	573	47	377	70	142
2	855	25	567	48	367	71	131
3	798	26	560	49	357	72	120
4	760	27	553	50	346	73	109
5	732	28	546	51	335	74	98
6	710	29	539	52	324	75	88
7	692	30	531	53	313	76	78
8	680	31	523	54	302	77	68
9	670	32	515	55	292	78	58
10	661	33	507	56	282	79	49
11	653	34	499	57	272	80	41
12	646	35	490	58	262	81	34
13	640	36	481	59	252	82	28
14	634	37	472	60	242	83	23
15	628	38	463	61	232	84	20
16	622	39	454	62	222	85	15
17	616	40	445	63	212	86	11
18	610	41	436	64	202	87	8
19	604	42	427	65	192	88	5
20	598	43	417	66	182	89	3
21	592	44	407	67	172	90	1
22	586	45	397	68	16	91	0
23	579	46	387	69	152		

TABLE IV.
Mr SIMPSON'S TABLE on the BILLS of MORTALITY at LONDON.

A.	Perf. liv.	A.	Perf. liv.	A.	Perf. liv.	A.	Perf. liv.
0	1280	24	434	48	220	72	59
1	870	25	426	49	212	73	54
2	700	26	418	50	204	74	49
3	635	27	410	51	196	75	45
4	600	28	402	52	188	76	41
5	580	29	394	53	180	77	38
6	564	30	385	54	172	78	35
7	551	31	376	55	165	79	32
8	541	32	367	56	158	80	29
9	532	33	358	57	151	81	26
10	524	34	349	58	144	82	23
11	517	35	340	59	137	83	20
12	510	36	331	60	130	84	17
13	504	37	322	61	123	85	14
14	498	38	313	62	117	86	12
15	492	39	304	63	111	87	10
16	486	40	294	64	105	88	8
17	480	41	284	65	99	89	6
18	474	42	274	66	93	90	5
19	468	43	264	67	87	91	4
20	462	44	255	68	81	92	3
21	455	45	246	69	75	93	2
22	448	46	237	70	69	94	1
23	441	47	228	71	64		0

From the preceding tables the probability of the continuance or extinction of human life is estimated as follows.

I. The probability that a person of a given age shall live a certain number of years, is measured by the proportion, which the number of persons living at the proposed age has to the difference between the said number, and the number of persons living at the given age.

Thus, if it be demanded, what chance a person of 40 years has to live seven years longer? From 445, the number of persons living at 40 years of age in Dr Halley's table, subtract 377, the number of persons living at 47 years of age, and the remainder, 68, is the number of persons that died during these 7 years; and the probability, or chance that the person in the question shall live these 7 years, is as 377 to 68, or nearly as 5½ to 1. By Mr Simpson's table, the chance is something less than that of 4 to 1.

II. If the year, to which a person of a given age has an equal chance of arriving before he dies, be required, it may be found thus: Find half the number of persons living at the given age in the tables, and in the column of age you have the year required.

Thus, if the question be put with respect to a person of 30 years of age, the number of that age in Dr Halley's table is 531, the half whereof is 265, which is found in the table between 57 and 58 years; so that a person of 30 years has an equal chance of living between 27 and 28 years longer.

III. By the tables, the premium of insurance upon lives may in some measure be regulated.

Thus, the chance that a person of 25 years has to live another year, is, by Dr Halley's table, as 80 to 1; but the chance that a person of 50 years has to live a year longer is only 30 to 1. And, consequently, the premium for insuring the former ought to be to the premium for insuring the latter for one year, as 30 to 80, or as 3 to 8.

In order to facilitate computations of annuities on lives, Mons. de Moivre assumed the age of 86 as the utmost probable extent of life, and supposed that equal numbers died at all ages, so that of 86 persons born at the same time, it might be expected one would die each year till the whole be extinct. The difference between any proposed age and 86 is called the complement of life.

PROB. I. To determine the value of an annuity of 1 l. to continue during the life of a person of a given age, allowing compound interest at a given rate.

It has been shown, concerning annuities certain, that if r be put for the amount of 1 l. and its interest for a year, the present value of 1 l. payable at the end of 1, 2, or more years is expressed by $\frac{1}{r}, \frac{1}{r^2}$ &c. But as the right to each annual payment depends on the continuance of life, we must multiply each of these terms, by the number expressing the probability, that the annuitant shall live to the end of 1, 2, or more years. Now, if n represents the number of persons alive at any age, and a the number of persons that die in the first year thereafter, then the number of

persons that live to the end of that year, is $n-a$. But the probability of the happening of any event, is measured by a fraction, whose numerator is the number of chances it has to happen, and whose denominator is the number of chances it has both

to happen and fail, therefore $\frac{n-a}{n}$ will represent

the chance a person of that age has to live another year. In like manner putting b for the number of persons that die in the course of the second year, the probability that the annuitant shall live

to the end of 2 years is $\frac{n-b}{n}$ and so on. There-

fore the value of the annuity is $\frac{n-a}{n r} + \frac{n-b}{n r^2}$ &c.

continued to the extremity of life.

If we assume Mr de Moivre's hypothesis, n is equal to the complement of life, and a, b , &c. each equal to 1, and the preceding series becomes

$\frac{n-1}{n r} + \frac{n-2}{n r^2}$ &c. which series is the difference

between $\frac{1}{r} + \frac{1}{r^2} + \frac{1}{r^3}$ &c. and $\frac{1}{n} + \left(\frac{1}{r} + \frac{2}{r^2}\right.$

$\left. + \frac{3}{r^3} \right)$ &c.) The former of these being a geomet-

rical series is equal to $\frac{1}{r-1} - \frac{1}{r-1} \times \frac{1}{r^n} =$ (if

we put $p = \frac{1}{r^n}$) $\frac{1-p}{r-1}$, and the latter is equal to

$\frac{1}{n} \times \left(\frac{r}{r-1} - \frac{n}{r^n} \times \frac{1}{r-1} - \frac{1}{r^n} \times \frac{r}{r-1} \right) =$

$\left(\frac{1-p \cdot r}{r-1} - \frac{n p}{r-1} \right) \times \frac{1}{n}$ Therefore $\frac{n-1}{n r} + \frac{n-2}{n r^2}$

&c. to n terms is equal to $\frac{1-p}{r-1} - \frac{1}{n} \times \left(\frac{1-p \cdot r}{r-1} \right.$

$\left. - \frac{n p}{r-1} \right) = \frac{(n-1+p) \cdot r - n}{n \cdot r - 1}$ the value of

the annuity required. Here p is the present value of 1l. due at the end of the complement of the life in question, which may be either computed arithmetically, or taken from a table of the present value of 1l. But the above theorem may be also accommodated to our

II. table, for putting the present value of 1l. an-

nunity for the complement of life, or $\frac{1-p}{r-1} = A$, we

get the present value of the life annuity of 1l. e-

qual to $1 - \frac{r}{n} A$. This theorem may be expressed

in words at length, as follows:

RULE. Find the complement of life; and, by Table II, find the value of 1l. annuity for the years denoted by the said complement; multiply this value by the amount of 1l. for a year, and divide the product by the complement of life; then subtract the quot. from 1; divide the remainder by the interest of 1l. for a year; and this last quotient will be the value of the annuity sought; or, in other words, the number of years purchase the annuity is worth.

EXAMP. What is the value of an annuity of 1l. for an age of 50 years, interest at 5 per cent.?

86
50 are given.

36 complement of life.

By the tables, the value is, 16.5468

Amount of 1l. for a year, 1.05

82.7340
1654.68

Complement of life, 36) 17.374140 (.581615

From unity, viz. 1.000000

Subtract .482615

Interest of 1l. .05) .517385 (10.3477 value sought.

By the preceding problem is constructed the following table.

TABLE V.

The VALUE of 1l. ANNUITY for a SINGLE LIFE.

Age.	3 per c.	3½ per c.	4 per c.	4½ per c.	5 per c.	6 per c.
9=10	19.87	18.27	16.88	15.67	14.61	12.84
8=11	19.74	18.16	16.79	15.59	14.54	12.79
7=12	19.60	18.05	16.70	15.52	14.48	12.74
13	19.47	17.94	16.60	15.44	14.41	12.69
6=14	19.33	17.82	16.51	15.36	14.34	12.63
15	19.19	17.71	16.41	15.27	14.27	12.58
16	19.05	17.59	16.31	15.19	14.20	12.53
5=17	18.90	17.47	16.21	15.10	14.12	12.48
18	18.76	17.34	16.10	15.01	14.05	12.42
19	18.61	17.22	16.00	14.92	13.97	12.36
4=20	18.46	17.09	15.89	14.83	13.89	12.30

Age.	3 per c.	3½ per c.	4 per c.	4½ per c.	5 per c.	6 per c.
21	18.30	16.96	15.78	14.74	13.81	12.24
22	18.15	16.83	15.67	14.64	13.73	12.18
23	17.99	16.70	15.55	14.54	13.64	12.11
3=24	17.83	16.56	15.44	14.44	13.55	12.04
25	17.66	16.42	15.32	14.3	13.47	11.98
26	17.50	16.28	15.2	14.21	13.37	11.91
27	17.33	16.13	15.07	14.15	13.28	11.84
28	17.15	15.98	14.95	14.02	13.19	11.6
29	16.98	15.83	14.82	13.90	13.09	11.69
30	16.80	15.68	14.68	13.79	12.99	11.61
2=31	16.62	15.53	14.55	13.67	12.88	11.53
32	16.44	15.37	14.41	13.55	12.78	11.45
33	16.25	15.21	14.27	13.43	12.67	11.36
34	16.06	15.04	14.13	13.30	12.56	11.28
35	15.86	14.87	13.98	13.17	12.45	11.19
36	15.67	14.70	13.83	13.04	12.33	11.10
37	15.46	14.52	13.68	12.91	12.21	11.00
38	15.26	14.34	13.52	12.77	12.09	10.97
1=39	15.05	14.16	13.36	12.63	11.97	10.81
40	14.84	13.98	13.20	12.48	11.84	10.70
41	14.63	13.79	13.03	12.34	11.70	10.60
42	14.41	13.60	12.86	12.18	11.57	10.49
43	14.19	13.40	12.68	12.03	11.43	10.38
44	13.96	13.20	12.50	11.87	11.29	10.26
45	13.73	12.99	12.32	11.71	11.14	10.14
46	13.49	12.78	12.13	11.55	10.99	10.02
47	13.25	12.57	11.94	11.37	10.84	9.89
48	13.01	12.35	11.75	11.19	10.68	9.76
49	12.76	12.13	11.55	11.01	10.51	9.63
50	12.51	11.90	11.34	10.83	10.35	9.49
51	12.26	11.67	11.13	10.64	10.18	9.35
52	11.99	11.44	10.92	10.44	10.00	9.20
53	11.73	11.20	10.70	10.24	9.82	9.05
54	11.46	10.95	10.48	10.04	9.63	8.89
55	11.18	10.70	10.25	9.83	9.44	8.73
56	10.90	10.44	10.01	9.61	9.24	8.56
57	10.62	10.18	9.77	9.39	9.04	8.39
58	10.32	9.91	9.53	9.17	8.83	8.21
59	10.03	9.64	9.27	8.9	8.61	8.02
60	9.73	9.36	9.02	8.6	8.39	7.83
61	9.42	9.08	8.75	8.4	8.16	7.6
62	9.11	8.79	8.48	8.2	7.93	7.43
63	8.79	8.49	8.20	7.94	7.68	7.22
64	8.46	8.19	7.92	7.65	7.43	6.99
65	8.13	7.88	7.63	7.4	7.18	6.77
66	7.79	7.56	7.33	7.1	6.91	6.53
67	7.45	7.24	7.03	6.8	6.64	6.29
68	7.10	6.90	6.71	6.54	6.36	6.04
69	6.74	6.56	6.39	6.2	6.07	5.78
70	6.38	6.22	6.06	5.92	5.77	5.51
71	6.01	5.87	5.73	5.6	5.47	5.23
72	5.63	5.50	5.38	5.26	5.15	4.94
73	5.25	5.14	5.03	4.93	4.83	4.64
74	4.85	4.76	4.67	4.58	4.49	4.32
75	4.45	4.37	4.29	4.22	4.14	4.00

UNITIES

Age	Value	Value	Value
30	3.85	3.5	3.60
35	3.47	3.41	3.31
40	3.11	3.03	2.93
45	2.77	2.64	2.58
50	2.45	2.33	2.30

1. If the two persons be of the same age, the value of the annuity is found by the following:
RULE. Take the value of the annuity from the table, multiply this value by the sum of the two ages, and the product will be the value of the annuity.
EXAMP. What is the value of an annuity of \$1 per year, payable for the joint lives of two persons, each reckoning interest at 4 per cent, one of 30 years?
 By the table, one life of 30 years is 3.85.
 Multiply by 60 (the sum of the two ages)
 Remainder . . . 231.00
 And 10-10 X 1000 = 1000000 the value lost
 1. If the two persons are of different ages, the value of the annuity is found by the following:
RULE. Take the value of the longer life from the table, multiply this value by the sum of the two ages, and the product will be the value of the annuity.
EXAMP. What is the value of an annuity of \$1 per year, payable for the joint lives of two persons, each reckoning interest at 4 per cent, one of 30 years and the other of 40 years?
 By the table, the value of 30 years is 3.85.
 Multiply by 70 (the sum of the two ages)
 Remainder . . . 269.50
 And 10-10 X 1000 = 1000000 the value lost
 2. To find the value of the annuity when the two persons are of different ages, and the annuity is payable for the joint lives of the two persons, the value of the annuity is found by the following:
RULE. Take the value of the longer life from the table, multiply this value by the sum of the two ages, and the product will be the value of the annuity.
EXAMP. What is the value of an annuity of \$1 per year, payable for the joint lives of two persons, each reckoning interest at 4 per cent, one of 30 years and the other of 40 years?
 By the table, the value of 30 years is 3.85.
 Multiply by 70 (the sum of the two ages)
 Remainder . . . 269.50
 And 10-10 X 1000 = 1000000 the value lost
 3. To find the value of the annuity when the two persons are of different ages, and the annuity is payable for the joint lives of the two persons, the value of the annuity is found by the following:
RULE. Take the value of the longer life from the table, multiply this value by the sum of the two ages, and the product will be the value of the annuity.
EXAMP. What is the value of an annuity of \$1 per year, payable for the joint lives of two persons, each reckoning interest at 4 per cent, one of 30 years and the other of 40 years?
 By the table, the value of 30 years is 3.85.
 Multiply by 70 (the sum of the two ages)
 Remainder . . . 269.50
 And 10-10 X 1000 = 1000000 the value lost

ANNUITIES

193

EXAMP. What is the value of an annuity of \$1, upon the longest of 3 lives, the one person being 30, and the other 40 years of age, interest at 4 per cent?

By the table, 30 years is . . . 34.68
 40 years is . . . 23.00

Value of their joint lives, by Prob. 3. } 57.88
 Calc. 2. 10. } 9.48

The longest life is 40 years . . . 23.00
 The annuity is any other than \$1, multiply the value found above by the given annuity.

If the two persons be of equal age, find the value of their joint lives by Calc. 1. of Prob. 2.

Prob. 4. To find the value of the next presentation to a single.

RULE. From the value of the first presentation, subtract the joint value of his and the decedent's life, and the remainder will be the value of \$1 annuity, which multiplied by the yearly income, will give the sum to be paid for the next presentation.

EXAMP. A enjoys a living of 2000. per annum, and B would purchase the said living for his life after A's death. The question is, What he ought to pay for it, reckoning interest at 5 per cent. A being 40, and B 35 years of age?

By the table, B's life is . . . 23.46
 Joint value of both lives, by Prob. 2. is 6.97

The value of \$1 annuity . . . 6.49
 Multiplied by . . . 100

Value of next presentation . . . 649.00

The value of a direct presentation in the form of any other annuity for life, and is found by the table; which being multiplied by the yearly income, gives the value sought.

Prob. 5. To find the value of a reversion for one, after two successive lives; or to find the value of a living after the death of the present incumbent and his successor.

RULE. By Prob. 3, find the value of the longest of the two lives, and subtract that value from the value of the perpetuity, and the remainder will be the value sought.

EXAMP. A, aged 50, enjoys an estate or living of 2000. per annum; B, aged 30, is entitled to the one of the same estate after A's death; and is proposed to sell the estate just now with the reversion of A and B's lives on it. What is the sum worth, reckoning interest at 4 per cent.?

By the table, A's life of 50 is . . . 11.34
 B's life of 30 is . . . 14.08

Sum, 25.42

Value of their joint lives, found by Prob. 2. Calc. 2. 10. } 8.60

Value of the longest life . . . 17.42 (sub.)
 From the value of the perpetuity, 25.00

Remains the value of \$1 reversion, 7.58

Multiplied by 2000 . . . 1516.00

Value of the reversion, 758.00

Vol. II. Part I.

PROB. 6. To find the value of the joint continuance of three lives, one life failing, the annuity to cease.

RULE. Find the single values of the three lives from the table; multiply these single values continually, calling the result the product of the three lives; multiply that product by the interest of \$1, and that product again by 2, calling the result the double product; then, from the sum of the several products of the lives, taken two and two, subtract the double product, divide the product of the three lives by the remainder, and the quotient will be the value of the three joint lives.

EXAMP. A is 30 years of age, B 34, and C 35; What is the value of their joint lives, reckoning interest at 4 per cent.?

By the table, the value of A's life is 26.1, of B's 14.43, and of C's 10.01.

26.1 X 14.43 X 10.01 = 3673.61, { product of the three lives.

.04

91.028

2

182.056, double product.

Product of A and B, 26.1 X 14.43 = 375.63

A and C, 26.1 X 10.01 = 261.26

B and C, 14.43 X 10.01 = 144.34

Sum of all, two and two, . . . 781.23

Double product subtracted, . . . 182.056

Remainder, . . . 599.17

And 3673.61 / 599.17 = 6.13, value sought.

PROB. 7. To find the value of an annuity upon the longest of three lives.

RULE. From the sum of the values of the three single lives taken from the table, subtract the sum of all the joint lives, taken two and two, as found by Prob. 2, and to the remainder add the value of the three joint lives, as found by Prob. 6, and that sum will be the value of the longest life sought.

EXAMP. A is 30 years of age, B 34, and C 35; What is the value of the longest of their three lives, interest at 4 per cent.?

By the table, the single value of A's life is 26.1
 Single value of B's life is 14.43
 Single value of C's life is 10.01

Sum of the single values, 50.53

By Prob. 2, the joint value of A and B is 20.76

Joint value of A and C is 18.19

Joint value of B and C is 7.45

Sum of the joint lives, 46.40

Remainder, . . . 4.13

By Prob. 6, the value of the 3 joint lives is 6.13

Value of the longest of the 3 lives . . . 30.27

The reader probably may wish that the reasons of the rules, which it must be owned, are intricate, had been assigned, but this could not be done without entering deeper into the doctrine of chances than would be proper in this place. See CHANCE. The preceding problems are sufficient.

always the same, or very nearly the same; and it makes, therefore, a more convenient transferable stock than the latter. During the two last mentioned wars, annuities, either for terms of years or for lives, were seldom granted but as premiums to the subscribers to a new loan, over and above the redeemable annuity or interest upon the credit of which the loan was supposed to be made. They were granted, not as the proper fund upon which the money was borrowed; but as an additional encouragement to the lender. Annuities for lives have occasionally been granted in two different ways: either upon separate lives, or upon lots of lives, which in French are called *Tontines*, from the name of their inventor. When annuities are granted upon separate lives, the death of every individual annuitant disburthens the public revenue so far as it was affected by his annuity. When annuities are granted upon tontines, the liberation of the public revenue does not commence till the death of all the annuitants comprehended in our lot, which may sometimes consist of twenty or thirty persons, of whom the survivors succeed to the annuities of all those who die before them; the last survivor succeeding to the annuities of the whole lot. Upon the same revenue more money can be raised by tontines, than by annuities for separate lives. An annuity, with a right of survivorship, is really worth more than an equal annuity for a separate life, and from the confidence which every man naturally has in his own good fortune, the principle upon which is founded the success of all lotteries, such an annuity generally sells for something more than it is worth. In countries where it is usual for government to raise money by granting annuities, tontines are upon this account generally preferred to annuities for separate lives. The expedient which will raise most money, is almost always preferred to that which is likely to bring about in the speediest manner the liberation of the public revenue. In France, before the late revolution, a much greater proportion of the public debts consisted in annuities for lives than in England. According to a *Memoir* presented by the parliament of Bourdeaux to the king in 1764, the whole public debt of France was estimated at 2400 millions of livres; of which the capital, for which annuities for lives had been granted, was supposed to amount to 300 millions, the fifth part of the whole public debt. The annuities themselves were computed to amount to 30 millions a year, the 4th part of 120 millions, the supposed interest of that whole debt. It was not the different degrees of anxiety in the two governments of France and England for the liberation of the public revenue, which occasioned this difference in their respective modes of borrowing; it arose altogether from the different views and interests of the lenders. In the former, the money lenders were, in general, either court bankers, farmers general, or tax gatherers, who, from a mean origin, had rose to great riches, and who, being too proud to marry their equals or inferiors, were despised by those haughty nobles, who considered themselves as their superiors; and therefore resolved to live bachelors. To such persons, who had no prospect of, or care for posterity, nothing was more convenient than to change

change their capital for a revenue, that would last just as long and no longer than they wished. But in Britain, the seat of government being in the greatest mercantile city in the world, the merchants are generally the people who advance money to government. By advancing it they do not mean to diminish, but, on the contrary, to increase their mercantile capitals; and unless they expected to sell with some profit their share in the subscription for a new loan, they never would subscribe. But if by advancing their money they were to purchase, instead of perpetual annuities, annuities for lives only, whether their own or those of other people, they would not always be so likely to sell them with a profit. Annuities upon their own lives they would always sell with loss; because no man will give for an annuity upon the life of another whose age and state are nearly the same with his own, the same price which he would give for one upon his own. An annuity upon the life of a third person, indeed, is, no doubt, of equal value to the buyer and the seller; but its real value begins to diminish from the moment it is granted, and continues to do so more and more as long as it subsists. It can never, therefore, make so convenient a transferable stock as a perpetual annuity, of which the real value may be supposed always the same, or very nearly the same.

* **ANNUITY.** *n. f.* [*annuité*, Fr.] 1. A yearly rent to be paid for term of life or years. The differences between a rent and an *annuity* are, that every rent is going out of land; but an *annuity* charges only the granter, or his heirs, that have assets by descent. The second difference is, that, for the recovery of an *annuity*, no action lies, but only the writ of *annuity* against the granter, his heirs, or successors; but of a rent, the same actions lie as do of land. The third difference is, that an *annuity* is never taken for assets, because it is no freehold in law; nor shall be put in execution upon a statute merchant, statute staple, or elegit, as a rent may. *Cowel.* 2. A yearly allowance.—He was generally known to be the son of one earl, and brother to another, who supplied his expence, beyond what his *annuity* from his father would bear. *Clarendon.*

ANNUITY OF TIENDS, in Scots law, a certain proportion of the tiends of erected benefices formerly payable to the crown, but now gone into disuse.

* **To ANNUL.** *v. a.* [from *nullus*.] 1. To make void; to nullify; to abrogate; to abolish.—That which gives force to the law, is the authority that enacts it; and whoever destroys this authority, does, in effect, *annul* the law. *Rogers.* 2. To reduce to nothing; to obliterate.—

Light, the pure work of God, to me's extinct,
And all her various objects of delight

Annul'd, which might in part my grief have eas'd. *Milton.*

* **ANNULAR.** *adj.* [from *annulus*, Lat.] In the form of a ring.—That they might not, in bending the arm or leg, rise up; he has tied them to the bones by *annular* ligaments. *Cheyne.*

ANNULAR CARTILAGE; the second cartilage of the larynx, being round, and investing the whole; called also *cricoides*.

ANNULAR FINGER, the fourth, or ring finger.

ANNULAR LIGAMENT, a strong ligament, encompassing the wrist; after the manner of a bracelet; also the ligament of the tarsus. The sphincter muscle of the *anus* is also called *annularis*, or *annular* muscle, from its figure.

ANNULAR PROCESS, a process of the Medulla oblongata; so called by Dr Willis, because it surrounds the same much like a ring.

* **ANNULARY.** *adj.* [from *annulus*, Lat.] In the form of rings.—Because continual respiration is necessary, the wind-pipe is made with *annular* cartilages, that the sides of it may not flag and fall together. *Ray.*

ANNULATA, in Zoology. See **COLUBER**.

* (1.) **ANNULET.** *n. f.* [from *annulus*, Lat.] 1. A little ring. 2. [In heraldry.] A difference or mark of distinction, which the fifth brother of any family ought to bear in his coat of arms. *Annulets* are also a part of the coat-armour of several families; they were anciently reputed a mark of nobility and jurisdiction, it being the custom of prelates to receive their investiture *per baculum & annulum*. 4. [In architecture.] The small square members in the Dorick capital, under the quarter round, are called *annulets*. 5. *Annulet* is also used for a narrow flat moulding common to other parts of the column; so called, because it encompasses the column round. *Chambers.*

(2.) **ANNULET**, in architecture, See § 1. It is the same member which Vitruvius calls a *fillet*; Palladio, a *listil* or *cincture*; Scamozzi, and Mr Brown, a *supercilium*, *list*, *tinea*, *eye-brow*, *square* and *rabbit*.

(3.) **ANNULET**, in heraldry, See § 1. Among the Romans it represented liberty and nobility. It also denotes strength and eternity, by reason of its circular form.

ANNULLING, [from *ad*, to, and *nullus*, none.] See **To ANNUL**.

* **To ANNUMERATE.** *v. a.* [*annumero*, Lat.] To add to a former number; to unite to something before mentioned.

* **ANNUMERATION.** *n. f.* [*annumeratio*, Lat.] Addition to a former number.

ANNUNCIADA, or **ANNUNTIATA**, a denomination common to several orders, both religious and military; instituted with a view to the ANNUNCIATION. (See § 1, 2, & 3.) 1. A religious order, instituted in 1232, by 7 Florentine merchants, called *Servites*, q. d. *Servants*. 2. A nunnery at Bourges, founded by Joan, queen of France, after her divorce from Lewis XII. 3. A nunnery founded by a Genoese lady in 1600. 4. A friary, founded by cardinal Torrecremata, at Rome, in 1460; the managers of which are grown so very rich, that they give fortunes of sixty Roman crowns to above 400 girls, on the anniversary of the Annunciation. 5. The knights of the *annuntiada*, was a military order, instituted in 1362, by Amadeus VI. duke of Savoy; in memory of Amadeus I. who defended the isle of Rhodes against the Turks. It was at first called the order of the True Lovers Knots; in memory of a bracelet of hair presented to the founder by a lady; but, upon the election of Amadeus VIII. to the pontificate, its name was changed for that of the *Annunciada*, in 1434. The great collar of the order, which the knights wear on public occasions, weighs 25 crowns.

of this preparation 3 or 4 grains may be given for a dose. By dissolving the opium thus in water, we get rid, not only of its gross parts, but also of its resinous, which are found more pernicious than the rest; and by dividing it afterwards with sugar, the medicine is rendered more uniform, soluble, and miscible with animal fluids.

(3.) ANODYNE BALSAM is made of Castile soap, camphor, saffron, and spirit of wine, digested in a sand heat. It is recommended not only for procuring ease in the most racking extremities of pain, but also for assisting in discharging the peccant matters that occasioned it. This balsam is much the same with the modern opodeldoc.

ANOIR. See ANEY.

* To ANOINT. *v. a.* [*oindre, enoindre*; part. *oint, enoint, Fr.*] 1. To rub over with unctuous matter, as oil, or unguents.—

Anointed let me be with deadly venom. *Shakesp.*
—Thou shalt have olive trees throughout all thy coasts, but thou shalt not *anoint* thyself with the oil: for thine olive shall cast his fruit. *Deut. xxviii. 40.* 2. To smear; to be rubbed upon.—

Warm waters then in brazen caldrons borne,
Are pour'd to wash his body, joint by joint,
And fragrant oils the stiffen'd limbs *anoint*.

Dryden.

3. To consecrate by unction.—

I would not see thy sister,

In his *anointed* flesh stick boarish fangs. *Shakesp.*

(1.) * ANOINTER. *n. s.* [from *anoint*.] The person that anoints.

(2.) ANOINTERS, a religious sect in some parts of England, so called from the ceremony they used of anointing all persons before they admitted them into their church. They founded their opinion of anointing upon the fifth of James, verses 14 and 15.

ANOLE, in zoology, a species of lizard common in the West Indies, about houses and plantations. It is of the size of the common lizard of Europe, but its head is longer, its skin of a yellowish colour, and its back variegated with green, blue, and grey lines running from the neck to the tail. They creep into holes at night, and make a continual and very disagreeable noise; in the day they are always in motion.

ANOLYMPIADES, in antiquity, a name given by the Elians to those Olympic games which had been celebrated under the direction of the Pisceans and Arcadians. The Elians claimed the sole right of managing the Olympic games, in which they sometimes met with competitors. The sixth Olympiad was celebrated by order of the Arcadians, by whom the Elians were at that time reduced very low: this, as well as those managed by the inhabitants of Pisa, they called *ανολυμπιαδας*, that is, "unlawful Olympiads;" and left them out of their annals, wherein the names of their victors and other occurrences were registered.

* ANOMALISM. *n. s.* [from *anomaly*.] Anomaly; irregularity; deviation from the common rule. *Di&*.

(1.) * ANOMALISTICAL. *adj.* [from *anomaly*.] Irregular; applied in astronomy to the year, even for the time in which the earth passeth through its orbit, distinct from the tropical year.

(2.) ANOMALISTICAL YEAR, in astronomy, is also called the *Periodical Year*. The space of time belonging to this year is greater than the tropical year, on account of the procession of the equinoxes. See ASTRONOMY.

(1.) * ANOMALOUS. *adj.* [*an priv. and ανωλ*.] Irregular; out of rule; deviating from the general method or analogy of things: It is applied, in grammar, to words deviating from the common rules of inflection; and, in astronomy, to the seemingly irregular motions of the planets.—There will arise *anomalous* disturbances, not only in civil and artificial, but also in military officers. *Brown's Vulgar Errors*.—He being acquainted with some characters of every speech, you may at pleasure make him understand *anomalous* pronunciation. *Holder*.—Metals are gold, silver, copper, tin, lead and iron: to which we may join that *anomalous* body, quicksilver, or mercury. *Locke*.

(2.) ANOMALOUS NOUNS. In those languages wherein the nouns are declined by genders, numbers, and cases, such as the Greek and Latin, there are a vast number of anomalous nouns, which are either defective, redundant or variable in one or other of these particulars. Thus *liber* and *arma*, want the singular; *aer* and *evum*, the plural; *chaos* wants the genitive; *suppetiae* want four cases, and *dicis*, five: *cetera* wants the masculine, *quisquis*, the feminine, and *plus*, both again *caelum*, plural, *caeli*, and *locus*, *loci* or *loca* are variable, and *materia*, *materies*, *aether*, *aethra*, &c. are redundant. But it is not in "inflection," or declension alone, that nouns are anomalous. Adjectives are also frequently so in comparison. Thus *bonus*, by the regular rule of comparison, should have *bonior*, *bonissimus*, in the comparative and superlative degrees; instead of which it has *melior* and *optimus*. The same adjective is equally anomalous in the Greek, as well as extremely redundant; *αγαθός*, having no fewer than seven comparatives, *αμεινιον*, *αριον*, *βελτιον*, *παρρειον*, *κρειστων*, *δαιμονιον*, and *χυρρειον*: and four superlatives, *αριεστις*, *βελτιστος*, *κρατιστος*, and *λοστος*, all of which are completely anomalous in their formation. In the English language, which has neither genders nor cases, there are few anomalous nouns it has are only so in number and comparison. Thus the substantive, *annual*, wants the singular, and *Sir* wants the plural. The adjectives, *good* and *evil*, instead of forming the comparatives and superlatives, according to the usual rule by adding *er* and *est*, (which would make *gooder*, *goodest*, *eviler*, *evilest*,) have the very irregular degrees of *better*, *best*, and *worse*, *worst*. The adjective, *little*, affords an instance of a double anomaly in its comparison, being both irregular in the formation of its degrees, *less* and *fewer*, and redundant, by having another comparative, *lesser*.

(3.) ANOMALOUS VERBS, in grammar, such as are not conjugated conformably to the paradigm of their conjugation. They are found in all languages. In Latin, the verb *lego* is the paradigm of the third conjugation; and runs thus, *lego*, *legis*, *legit*: By the same rule *fero* should be *feris*, *ferit*; *fero* is therefore an anomalous verb. In English the irregularity relates often to the preterite tense and passive participle: for example, *give*, were formed according to rule, would make *gived* and

Sometimes, *anon* in shady vale, each night,
Or harbour'd in one cave, is not reveal'd: *Milt.*

ANONIS, in botany. See ONONIS.

ANONYMAL. See ANONYMOUS, § 1.

ANONYMOS. See CHELONE.

(1.) * ANONYMOUS. *adj.* [*a priv.* and *onym.*]

Wanting a name.—These animalcules serve also for food to another *anonymous* insect of the waters. *Ray.*—They would forthwith publish slanders unpunished, the authors being *anonymous*, the immediate publishers thereof sculking. *Notes on the Dunciad.*

(2.) ANONYMOUS, in anatomy, a name sometimes given to parts newly discovered. The 2d cartilage of the throat, now called *cricoides*, or *annuliformis*, was anciently stiled *anonymus*.

(3.) ANONYMOUS, in commerce. Before the late revolution, partnerships in trade in France were stiled anonymous, when they were not carried on under any particular name, but wherein each of the partners traded visibly on his own account, and in his own name; after which all the partners gave one another an account of their profit or loss. These sorts of partnerships were known only to the parties themselves. There was also another species of anonymous partnerships in France, wherein persons of fortune and quality deposited sums of money, in order to share the profit and loss. Those who furnished the capital had no trouble in carrying on the trade, nor did their names appear to be any way interested therein. The extinction of nobility and the establishment of equality, has doubtless now put an end to all such anonymous partnerships, which the pride of the French *Noblesse* alone gave birth to.

(4.) ANONYMOUS, in law. The sending anonymous letters demanding money, &c. is felony by the Black Act, 9. Geo. I. cap. 22.

(5.) ANONYMOUS, in literature, is a term usually applied to books, which do not express the author's name, or to authors whose real names are unknown, such as the celebrated *Letters of Junius*, &c.

(6.) ANONYMOUS SPIRIT, in chemistry, a spirit extracted from tar and wood.

* ANONYMOUSLY. *adv.* [from *anonymous*.] Without a name—I would know, whether the edition is to come out *anonymously*, among complaints or spurious editions. *Swift.*

ANONYMUS. See ANONYMOUS, § 2.

(1.) * ANOREXY. *n. f.* [*anorex.*] Inappetency, or loathing of food. *Quincy.*

(2.) ANOREXY, CAUSES AND CURE OF. ANOREXIA, [from *a neg.* and *orex.*, appetite,] is either original or symptomatic. When it is original, its causes are, bad diet, too free drinking, voraciousness, &c. : In which cases, a vomit of ipecacuanha may be taken; after which temperance, a light but cordial nourishing diet, and daily exercise, persisted in, will generally effect a recovery. But it is more frequently a symptom of some other disorder; and then the cure depends on the removal of the original one.

(1.) ANOSSI, GEOGRAPHY AND NATURAL HISTORY OF. A province of the island of Madagascar, lying between Lat. 23. 18. and 26. S. It is watered by many rivers, most of which run

Franchere, Ramevatte, or Immour, the

spring of which is in a mountain called *Mangia* and discharges itself into the sea in Lat. 25. 18. The mouth of this river is often stopped, and its course to the sea interrupted, unless kept open by the overflowings of great rains and high tides. The water runs salt one league above the mouth, particularly in a free communication with the sea. A lake, called *Ambou*, is formed at the mouth half a league wide, with depth sufficient for a ship if the mouth of the river was kept open. Next in bigness to the Franchere is the Mangha which springs from a mountain called *Silira*, and empties itself into the sea, where large ships may ride at anchor. Crocodiles breed in these and the other rivers of the island. Between the two rivers above mentioned lies Cape St Romain, but a mile distant from the mouth of the Franchere and which runs from the N. W. 6 or 7 leagues into the sea. When the Cape is passed, the coast forms a great bay, in the shape of a cross, which extends to the mouth of a river called *Dian Frouge*, or *Piterab*. In the middle of this bay the land runs out, and almost forms a peninsula, called *Tbolangare*. Fort Dauphin lies to the N. of this peninsula, and Port Dauphin over against it. This province has several other peninsulas and small islands belonging to it. The country is beautiful; abounds in fruit trees; is fertile in pastures for cattle; and, if carefully cultivated, would produce all the necessaries of life. It is surrounded by high mountains, which are covered with woods and shrubs; but, about 4 miles distant from Fort Dauphin, the adjacent hills are quite destitute of verdure. The French often dig in this neighbourhood, expecting to meet with mines of gold and silver, particularly in one mountain where several springs flow near each other, and empty themselves into a neighbouring river. In this river they found several stones and pebbles intermixed with yellow clay, with a great quantity of black and white spangles shining like silver, which they carefully pounded and washed, but without effect. About 60 yards above the springs, the grass, and every sort of vegetable, appears half dried and yellow, from a metallic sulphur, which gives that aspect; but the top of the mountain is covered with a fresh and beautiful verdure. It is said that the Portuguese found gold at the foot of this mountain on the N. side, but that the place they had dug was filled up by the chiefs of the country after the Portuguese had been driven out.

(2.) ANOSSI, INHABITANTS, RANKS, CUSTOMS, &c. OF. Anossi is inhabited by 3 different sorts of whites, and 4 sorts of negroes. The whites are distinguished by the names of Rohandrians, Anacandrians, and Ondzati. The whites are distinguished from the negroes, by the general name of Zaferamini, or Rahimini; and the Rohandrians are distinguished above the other whites. When they proceed to an election of sovereign, whom they call Ompiandrian, or Dian Bahouache; he is chosen from the Rohandrian race. Next to him, the others hold the rank of princes, and are honoured as such, by all the rest of the subjects. The Anacandrians are descendants of the chiefs, but who have degenerated, and are accounted the bastards of princes, or those

allowed to an unhappy people, driven from their own habitations: that, at the same time, wide tracts might be retained for the horses and cattle of the soldiers to graze in: that it was inconsistent with humanity to furnish men in order to feed beasts, &c. and at last, lifting up his eyes to heaven, he asked the celestial luminaries how they could behold a desolate soil, and if they would not more justly let loose the sea to swallow up usurpers, who had engrossed the whole earth? To this the Roman commander, Avitus, replied, that the weakest must submit to the strongest; and that since the gods, to whom they had appealed, had left the sovereign judgment to the Romans, they were resolved to suffer no other judges than themselves. To Boiocalus himself, however, he privately offered lands as a reward for his long attachment to the Romans: but this offer the brave German rejected, as a price for betraying his people; adding, "A place to *live* in we may want, but a place to *die* in we cannot." The Ansibarii now invited the neighbouring nations to join them against the Romans; but they, dreading the power of that nation, refused to give them any assistance: upon which they applied to the neighbouring nations, begging leave to settle in their territories; but being every where driven out as enemies and intruders, these unhappy people were reduced to wander up and down till every one of them perished.

ANSICANS, or } the inhabitants of Ansiko,
ANSIKANS, } are neat, well proportioned, and strong: wandering about from place to place, without either sowing or reaping. They are dreaded for their extreme brutality, and never traded with by the Europeans. They are equal to the Giagas in fierceness and barbarity. They are so accustomed to the eating of human flesh, that it is asserted they have markets where it is publicly sold, and that there are no other graves for the dead than the bellies of the living. They try the courage of their prisoners of war by shooting at them as at marks, directing their arrows above or around their heads; and whoever discovers the least signs of fear, is immediately devoured without mercy. Those who appear intrepid and resolute, have their noses and ears bored, and two fore teeth of the upper jaw drawn. They are then improved in barbarity, by accustoming them to the most horrid cruelties. The language of the Ansikans is barbarous, and difficult to be learned, even by the inhabitants of Congo. The most distinguished among them wear red and black caps of Portuguese velvet; the lower ranks go naked from the waist upwards; and, to preserve their health, anoint their bodies with a composition of pounded white sandal wood and palm oil. Their arms are battle axes, and small but very strong bows adorned with serpents skins. Their strings are made of supple and tender shoots of trees, that will not break, and their arrows of hard and light wood. These people, who kill birds flying, shoot with such surprising swiftness, that they can discharge 28 arrows from the bow before the first falls to the ground. With equal dexterity they manage their battle axes; one end of which is sharpened and cuts like a wedge, and the other flattened like a mallet, with a handle

let between, about half the length of the iron rounded at the end like an apple, and covered with the skin of a serpent. The current money among them is the zimbis or shell, which is fished for, and passes among several African nations. They worship the sun as their chief deity; whom they represent by the figure of a man, and the moon by that of a woman. They have also an immense number of inferior deities, each individual having a particular idol whom he addresses on certain occasions.

ANSIKO, or ANSICO, a kingdom of Africa, bounded on the W. by the river Umbre which runs into the Zaire, the kingdom of Wangua, and the Amboes who border on Loango; on the N. by some deserts of Nubia; and on the S. by Songo and Sonda, provinces of Congo. Here are great numbers of wild beasts, as lions, rhinoceroses, &c. and men still more savage. Ansiko has many copper mines. The king of Ansiko, or great Macco, commands 13 kingdoms, and is esteemed the most powerful monarch in Africa. The inhabitants of Angola have a tradition, that this is the proper country of Giagas, who came originally from Sierra Leona, and over ran like a torrent the whole coast as far as Benguela; but that, being weakened by numerous battles, and unable to force the defiles in order to return to Sierra Leona, they arrived on the borders of Monomotapa, where being defeated, they were forced to remain in the provinces of Ansiko. See ANSICANS.

ANSIVARII, See ANSIBARII.

ANSLO, or ONSLO, a sea port town of Norway, in the province of Aggerhuys, 100 miles N. of Gottenburgh, with a bishop's see, under the Abp. of Drontheim. The supreme court of justice is held here for Norway. It is seated on a bay of the same name. Long. 10. 14. E. Lat. 50. 24. N.

ANSON, George, the son of William Anson, Esq; of Huckborough, in Staffordshire. Showing an early inclination to the sea, he received a suitable education. The first command he enjoyed was that of the Weazle sloop in 1722; but the most memorable action of his life, and the foundation of his future good fortune, took place on his receiving the command of five ships, a sloop, and two victuallers, equipped to annoy the Spaniards in the South Seas, and to co-operate with admiral Vernon across the Isthmus of Darien: an expedition the principal object of which failed, by the unaccountable delay in fitting out the squadron. He sailed, however, in Sept. 1740; doubled Cape Horn in a dangerous season; lost most of his men by the scurvy; and with only one remaining ship, the Centurion, crossed the great Pacific Ocean. If no considerable national advantage resulted from this voyage, Commodore Anson made his own fortune, and enriched his surviving companions, by the capture of a rich galleon on her passage from Acapulco to Manilla; with which he returned home round the Cape of Good Hope. He was no less fortunate in escaping a French fleet then cruising in the channel, by sailing through it during a fog. He arrived at Spithead in June 1744. He was soon after appointed rear-admiral of the blue, and a lord of the admiralty. In April 1745, he was made rear-admiral of the white,

July, and 12th November. Long. 2. 25. W. Lat. 56. 20. N.

ANSTY, two villages; viz. 1. in Devonshire, near S. Moulton: 2. in Wiltshire, near Wardour Castle.

ANSURII, the collectors of the ANSURIUM.

ANSURIUM. See ANSARIUM.

* ANSWER. *n. s.* [from *To answer.*] That which is said, whether in speech or writing, in return to a question, or position.—It was a right *answer* of the physician to his patient, that had sore eyes: If you have more pleasure in wine, than in your fight, wine is good. *Locke.* How can we think of appearing at that tribunal, without being able to give a ready *answer* to the questions which he shall then put to us, about the poor and the afflicted, the hungry and the naked, the sick and imprisoned? *Atterbury.* 2. An account to be given to the demand of justice.—

He'll call you to so hot an *answer* for it,

That you shall chide your trespass. *Shakespeare.*

3. In law, a confutation of a charge exhibited against a person.—A personal *answer* ought to have three qualities; it ought to be pertinent to the matter in hand; it ought to be absolute and unconditional; it ought to be clear and certain.

Ayliffe.

* To ANSWER. *v. n.* [The etymology is uncertain; the Saxons had *anderanian*, but in another sense; the Dutch have *antwoorden*.] 1. To speak in return to a question.—

Are we succour'd? are the Moors remov'd?

Answer these questions first, and then a thousand more.

Answer them altogether.

Dryden.

2. To speak in opposition.—No man was able to *answer* him a word. *Matt.* xxii. 46.—If it be said, we may discover the elementary ingredients of things, I *answer*, that it is not necessary that such a discovery should be practicable. *Boyle.*

3. To be accountable for: with *for*.—

Those many had not dared to do evil

If the first man that did th' edict infringe

Had *answer'd for* his deed.

Shakespeare.

Some men have sinned in the principles of humanity, and must *answer for* not being men. *Brown's Vulgar Errors.*—If there be any absurdity in this, our author must *answer for* it. *Locke.* 4.

To vindicate; to give a justificatory account of: with *for*.—The night, so impudently fixed for my last, made little impression of myself; but I cannot *answer for* my family. *Swift.* 5. To give an account.—How they have been since received, and so well improved, let those *answer* either to God or man, who have been the authors and promoters of such wise council. *Temple.*—

He wants a father to protect his youth,

And rear him up to virtue. You must bear

The future blame, and *answer to* the world

When you refuse the easy honest means

Of taking care of him.

Southern.

6. To correspond to; to suit with.—As in water face *answereth* to face, so the heart of man to man. *Prov.* xxvii. 19. 7. To be equivalent to; to stand for something else.—A feast is made for laughter, and wine maketh merry: but money *answereth* all things. *Ecc.* x. 19. 8. To satisfy claim or petition, of right or justice.—Zel-

mane, with rageful eyes, bade him defend himself; for no less than his life would *answer* it. *Sidney.*—

Revenge the jeering and disdain'd contempt
Of this proud king, who studies day and night
To *answer* all the debt he owes unto you,
Ev'n with the bloody payments of your deaths.

Shakespeare.

Let his neck *answer* for it if there is any martial law in the world. *Shakespeare.*—Men no sooner find their appetites *unanswered*, than they complain the times are injurious. *Raleigh.*—The yearly rent is still paid, even as the former casualty itself was wont to be, in parcel meal paid in and *answered*. *Bacon.* 9. To act reciprocally.—

Say, do'st thou yet the Roman harp command?

Do the strings *answer* to thy noble hand?

Dryden.

10. To stand as opposite or correlative to something else.—There can but two things create love, perfection and usefulness; to which *answer*, on our part, 1. Admiration; and 2. Desire: and both these are centered in love. *Taylor.* 11. To be proportion to.—Weapons must needs be dangerous things, if they *answered* the bulk of so prodigious a person. *Swift.* 12. To perform what is endeavoured or intended by the agent.—On our part is, to choose out the most deserving objects, and the most likely to *answer* the ends of our charity; and when this is done, all is done that lies in our power: the rest must be left to Providence. *Atterbury.* 13. To comply with.—

He dies that touches of this fruit,

Till I and my affairs are *answered*. *Shakespeare.*

14. To succeed; to produce the wished event.—Jason followed her counsel, whereto, when the event had *answered*, he again demanded the fleece. *Raleigh.*—In operations upon bodies, for their version and alteration, the trial in great quantities doth not *answer* the trial in small: and so deceiveth many. *Bacon.* 15. To appear to any call, or authoritative summons; in which sense, though figuratively, the following passage may be, perhaps, taken.—Thou wert better in thy grave, than to *answer*, with thy uncovered body, this extremity of the skies. *Shakespeare.* 16. To be over-against any thing.—

Fire *answers* fire, and, by their paly beams,
Each battle sees the other's ombred face.

Shakespeare.

* ANSWERABLE. *adj.* [from *answer.*] 1. That to which a reply may be made; that which may be answered; as, the argument, though subtle, is yet *answerable*. 2. Obligated to give an account; obliged to answer any demand of justice; or stand the trial of an accusation.—Every chief of every kindred or family should be *answerable*, and bound to bring forth every one of that kindred, at all times to be justified, when he should be required, or charged with any treason or felony. *Spenser's State of Ireland.*—Will any man argue, that if a physician should manifestly prescribe poison to all his patients, he cannot be justly punished, but is *answerable* only to God? *Swift.*—He cannot think ambition more justly laid to their charge, than to other men, because that would be to make church government *answerable*.

Lat. *man, with useful man.*
 20. *for so late that he*
 21. *there*
 22. *Revenge the wrongs of*
 23. *Of this good man, who*
 24. *To us are all the debt!*
 25. *For a walk the bloody ps*

26. *Let his rock as low for*
 27. *as he would, and*
 28. *find such spectators*
 29. *as the street are*
 30. *and rest is of the road, on*
 31. *was wont to be*
 32. *and as word, *Baron* for*
 33. *Say, do it thou yet!*
 34. *mind!*
 35. *Do the Knight *answer**

36. *To stand as opposite*
 37. *to the *of*—Then, as he*
 38. *perfection and undisturb*
 39. *ed, *Admiral*, *Admiral*,*
 40. *the are omitted as one*
 41. *men in—*Vi* capos*
 42. *to, if they *answer**
 43. *to a *perfection*, *Suff**
 44. *to *discovered* or *intend**
 45. *to *to choose out the**
 46. *the most likely to*
 47. *city, and when this is*
 48. *has a *our power*, the *is**
 49. *to *our power*, the *is**
 50. *to *our power*, the *is**

51. *to *our power*, the *is**
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 69. *to *our power*, the *is**
 70. *to *our power*, the *is**

in nature. *Sough*,
 ich a likeness as
 favorable enough
 erring in others.
 were ladies, who,
 be registered in
 rich children
 ist begot them.

able—
 id
 vable; add faith,
 not; add love
 r, the soul
 Milton.
 ring, by certain
 which a great
 soldiers to him
 own, hath been
 Acts. *Baron*—
 in

Milton.
 no kings whose
 men's defects.
 e.—That, to e-
 there should be
 his provided pac-
 e. *Hooker*.
 (from *answer*—
 verable. *Do*,
 on *answerable*.]
 correspondence;
 if they be entire,
 favorably deeper.
 a light form, in-
 a lesser height,
 or intensions of

answer.] 7. He
 turn to what a-
 or mind, and I
 like a niggardly
 e bounds of the
 wages the com-
 pens first.—It is
 play ignorance
 ves his *answer*—
 rom *answer* and
 of writing an-
 aving any thing
 they have no

ch *Jonas* in-
 have been first
 red to *ant*.] *Ant*
 & that lives in
 this.—We'll let
 there's no
 re-
 ant-hills are,
 as I see
 taking pains,
 gge, *Draw*, and
Domus.
 vus, *polities*,
 m of bees. *Pape*.
 mica and *Tis-*

ANT, a contraction for *ant*, or rather *and*
 of it; *an*, *an's* *please* you, that is, *and if it please*
 you.
 (1.) * ANT-BEAR, *a. f.* [from *ant* and *bear*.] An
 animal that feeds on ants.
 (2.) ANT-BYSS, or ANT-BYSS, in zoology.
 See MYRMECOPHAGA
 (3.) * ANT HILL, or WILLOW, *a. f.* [from *ant*
 and *hill*.] The small protuberances of earth in
 which ants make their nests.—Put blue flowers
 into an *ant-hill*, they will be stained with red;
 because the ants drop upon them their flagging
 liquor, which hath the effect of oil of vitriol. *Ray*.
 —Those who have seen *ant hills*, have easily
 perceived those small heaps of earth about their
 nests. *Addison*.
 (4.) ANT HILL, MYRMIDON OF DISTORTION.
 Ant hills do a great deal of mischief to dry
 pastures, not only by wasting so much land as they
 cover, but by rendering the *kythe* in mowing the
 grass, and yielding a poor hungry food pernicious
 to cattle. The manner of destroying them so
 to cut them into a part from the top, and then
 dig into them so deep as to take out the core be-
 low, so that where the turf is laid down again, it
 may lie somewhat lower than the level of the rest
 of the land: by this means it will be wetter than
 the rest of the land; and this will prevent the
 ants from returning to the same place, which o-
 therwise they would certainly do. The earth that
 is taken out must be scattered to as great a dis-
 tance as they way as may be, otherwise they will
 collect it together and make another hill just by.
 The proper time for doing this is winter; and if
 the places be left open, the frost and rains of that
 time of the year will destroy the rest. but in this
 case care must be taken that they are covered up
 early enough in the spring, otherwise they will be
 less fertile in grass than the other places. In Heri-
 fordshire they use a particular kind of spade for
 this purpose. It is very sharp, and formed at the
 top into the shape of a crescent, so that the whole
 edge makes up more than three-fourths of a circle;
 this cuts in every part, and does the business very
 quickly and effectually. Others use the same in-
 struments that they do for mole-hills. Human
 dung is a better remedy than all these, as is pro-
 ved by experiment; for it will kill great numbers
 of them, and drive all the rest away, if only a
 small quantity of it be put into their hills. Un-
 stacked lime has also been used successfully.

ANT-LION. See FORMICA LEO.
 ANT, MUZZ, the same given by Lister and
 Ray, to a peculiar species of ant, which is of the
 number of the perfumed insects. It is found on
 dry banks, and is so much smaller than the com-
 mon ant, that it needs no other distinction. Those
 of this species which are without wings are of a
 yellowish colour, and when bruised or crushed e-
 mit a sharp and acid smell, as the common ant
 does; but those which have wings are coal-black,
 and these instead of the four smell of the others,
 emit a perfume not to be endured for its strength.
 The fasci of all the perfumed insects goes off in
 heaping, and these little creatures, after they have
 been dead and dry some time, are found to smell
 less strongly, but much more agreeably. Phil.
 Trans. N° 77.

ANTS, ACID OF, an acid produced by distilling millions of these insects, either without addition, or with water. It resembles vinegar in many respects; but differs from it in forming crystals with magnesia, iron, and zinc. Its attractions are not yet determined, but seem to coincide with those of vinegar.

ANTS EGGS, a kind of little white balls found in the nests of ants, ordinarily supposed to be the ova of this insect. Late naturalists have observed, that these are not properly the ants eggs, but the young brood themselves in their first state; they are so many little vermiculi wrapped up in a film or skin, composed of a sort of silk, which they spin out of themselves as silk-worms and caterpillars do. At first they are hardly observed to stir; but, after a few days continuance, they exhibit a feeble motion of flexion and extension; and begin to look yellowish and hairy, shaped like small maggots, in which shape they grow up till they are almost as large as ants. When they pass their metamorphosis, and appear in their proper shape, they have a small black speck on them close to the anus of the included ant, which M. Lewenhoeck probably enough imagines to be the feces voided by it. Sir Ed. King, M. D. opened several of these vulgarly reputed eggs; in some of which he found only a maggot in the circumstances as above described; while in another the maggot had begun to put on the shape of an ant about the head, having two little yellow specks, where the eyes were to be. In others, a further progress was observed, the included maggots being furnished with every thing to complete the shape of an ant, but wholly transparent, the eyes only excepted, which were as black as bugles.—Lastly, in others, he took out ants every way perfect and complete, which immediately crept about among the rest. These supposed ants eggs are brought up every morning in summer, near the top of the nest, where they are lodged all the warm part of the day, within reach of the sun's influence. At night, or if it be cool, or like to rain, they carry them down to a greater depth; so that you may dig a foot depth e'er you come at them. The true ants eggs are the white substance, which upon opening their banks, appears to the eye like the scatterings of fine white sugar, or salt, but very soft and tender. Examined by a microscope, it is found to consist of several pure, white appearances, in distinct membranes, all figured like the lesser sorts of birds eggs, and as clear as the bladder of a fish. The same substance is found in the bodies of the ants themselves. On this spawn, when emitted, they lie in multitudes, to brood, till it is turned into little vermicles as small as mites, commonly called *ants-eggs*.

ANTS, VISITING. At Paramaribo, a Dutch colony in the province of Surinam, there are a species of ants, which the Portuguese call *visiting ants*; they march in troops; and as soon as they appear, all the coffers and chests of drawers are laid open, which they clear of rats, mice, and a peculiar sort of insect in that country called *cack-ants*, and of other noxious animals. If any one attempts to molest them, they fall upon him, and piece his stockings and shoes. Their visits

are rare: and sometimes they do not come more than once in 3 years. *Templeman's Obs. vol. i. p. 76.*

(1.) **ANTA**, in the ancient architecture, a square pilaster, placed at the corners of a temple.

(2.) **ANTA**, or **ANTE**, a small kingdom on the Gold-Coast of Africa, extending about 100 miles in length. The country is covered with palm-trees, among which stands a number of fine villages. The soil is exceedingly rich, and the climate is very beautiful. The air is also much more salubrious than in other places of the coast, it being observed by all writers, that the mortality of deaths here bears no proportion to that of other part of the coasts of Guinea. The country contains the following villages, which are particularly described on account of the commerce they drive; viz. *Bourtrey*, *Tokor*, *Ada*, and *Sama*; for which, see those articles. Formerly Anta was potent and populous, but bit by a bold and rapacious people, who annoyed the Europeans by their depredations; but by continual wars with their neighbours they are now greatly enfeebled, and the country in a manner depopulated. The few remaining inhabitants is fled to the interior, dispirited, and abject, seeking protection from the Dutch and other Europeans who have settled on this coast, and looking upon them as their friends.

ANTACÆUS, in ichthyology, a name given by Ælian and Strabo to the *ichthys antacæus*, the singlasp-fish, or *buso*; and afterwards by Pline and others, not only to this fish, but to the common sturgeon.

ANTACHATES is used by some for a kind of bituminous stone, of the colour of amber, though of a different colour. When burning yields a smell like myrrh.

ANTACID. See **ANTI-ACID**.

ANTÆ. See **ANTICUM**.

ANTÆCI. See **ANTOECI**.

(1.) **ANTÆUS**, in fabulous history, the son of Neptune and Telephus, king of Lycia, who, being to build a temple to his father, offered to slay all he met, but Hercules fighting him, perceiving the assistance he received from the earth (for by a touch of the earth he himself when weary,) lifted him up from the ground and squeezed him to death.

(2.) **ANTÆUS**, CONJECTURES CONCERNING the king of Mauritania; and if we are to explicate true history out of fabulous circumstances, it would appear that he was the same with Atlas. They are supposed to have been sons of Neptune, who reigned in Mauritania, Numidia, and a great part of Africa, as may be inferred from his having the same peculiar marks of distinction conferred upon the inhabitants of those regions. They were both with absolute power over a great part of Africa, particularly Tingitania. Hercules slew Antæus in the same war whereby he freed Libya from Atlas: both Atlas and Antæus were sons of Neptune, and contended with Hercules with the gods, and were both vanquished. Antæus, as well as Atlas, was a great philosopher, and knowledge in Astronomy; from all

ANT *ANTECEDENT*. *a. f.* [from *ante*, before, and *cedere*, to go.] To precede in position, or to go before. It is contrasted to *consequent*, that which follows, or succeeds to another.

ANT *ANTECEDENCE*. *a. f.* [from *ante*, before, and *cedere*, to go.] A thing that precedes another, or that goes before it. It is a thing that is antecedent to another, or that precedes it.

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the universities of France, the teachers of law, and the revolution, took the title *antecessores* in all their titles. Whether the doctrine of equality, as defined by the new constitution, allows of such distinctions, we know not, but literary titles may surely be preserved, though political distinctions be abolished.

ANTECHAMBER. *a. f.* [from *ante*, before, and *chamber*, a room.] A room that leads to the apartment.

The emperor has the antechamberer pass. As this way moves with a disorder'd haste.

ANTECHAMBER. *a. f.* [from *ante*, before, and *chamber*, a room.] A room that leads to the apartment.

ANTECURSOR. *a. f.* [from *ante*, before, and *cursor*, a runner.] One who goes before.

ANTICIPATIONS. In the Roman armies, a party of horse detached before, partly to get intelligence, provisions, &c. and partly to choose a place to encamp in. These were also called *antecursori*, and by the Greeks *proedromi*.

ANTEDATE, among lawyers, a signature or date prior to the true date of a bond, bill, or other instrument.

ANTEDATE. *a. f.* [from *ante*, before, and *date*, to date.] To date earlier than the real time, to confer a fictitious antiquity.

Now thou hast lov'd me one whole day, Tomorrow, when thou lov'st, what wilt thou say?

What thou then antedates some new-made type, Or say that now

Or say that now

Or say that now

Or say that now

Or say that now

Or say that now

Or say that now

Or say that now

Or say that now

Or say that now

Or say that now

Or say that now

Or say that now

Or say that now

fore, and *diluvium*, a deluge.] 1. Existing before the deluge.—During the time of the deluge, all the stone and marble of the antediluvian earth were totally dissolved. *Woolward*, 2. Relating to things existing before the deluge.—The text understands only the line of Seth condescendable unto the genealogy of our Saviour, and the antediluvian chronology. *Brown's Vulgar Errors*.

ANTEDILUVIAN. *a. f.* One that lived before the flood.—We see in the first part relating to God, that he hath not excluded the period of our lives to the longevity of the antediluvians, that we give him thanks for contracting the days of our trial. *Bentley*.

ANTEDILUVIANS, a general name for all mankind who lived before the flood, including the whole human race from the creation to the deluge.

ANTEDILUVIANS, CHRONOLOGY OF THE. As Moses has not set down the particular time of any transaction before the flood, except only the years of the fathers' ages, wherein the several decedents of Adam in the line of Seth were begotten, and the length of their several lives, chronologists have endeavored to fix the years of the lives and deaths of those patriarchs, and the distance of time from the creation to the deluge.

In this there could be little difficulty were there no varieties in the several copies we now have of Moses's writings, viz. the Hebrew, the Samaritan, and the Greek versions of the Septuagint; but as these differ very considerably from one another, learned men are much divided in their opinions concerning the chronology of the first ages of the world; some preferring one copy, and some another. That the reader may the better judge of these variations, they are exhibited in the following table, with the addition of those of Josephus as corrected by Dr. Wells and Mr. Whiston; to which we subjoin other three tables to explain the consequence of these variations by showing a what year of his contemporaries, the birth and death of each patriarch happened, according to the computations of these different versions.

L. A Table of the Years of the Antediluvian Patriarchs.

Ages of the Patriarchs at the Births of their Sons.	Years they lived after their Sons Births.				Length of their Lives.			
	Heb.	Sam.	Sept.	Joc.	Heb.	Sam.	Sept.	Joc.
Adam	130	130	230	130	800	800	700	930
Seth	105	105	205	105	807	807	707	912
Enoch	90	90	190	90	815	815	715	905
Cainan	70	70	70	70	840	840	740	910
Mahalel	65	65	105	65	810	810	710	895
Jared	162	62	162	62	800	785	800	904
Noah	65	65	105	65	300	300	200	365
Methuselah	187	67	187	187	762	653	802	960
Lamech	182	82	182	182	595	600	505	777
Noah was aged at the Flood.	600	600	600	600				

To the Flood, 1656 1307 2242 1556

II. A CHRONOLOGICAL TABLE of the YEARS of the PATRIARCHS according to the COMPUTATION of the HEBREW.

	Year of the world.	Years of Seth.	Years of Enos.	Years of Cainan.	Years of Mahalaleel.	Years of Jared.	Years of Enoch.	Years of Methuselah.	Years of Lamech.	Years of Noah.
Adam created,	1									
Seth born,	130									
Enos born,	235	105								
Cainan born,	325	195	90							
Mahalaleel born,	395	565	160	70						
Jared born,	460	330	225	135	65					
Enoch born,	622	492	387	297	227	162				
Methuselah born,	687	557	452	362	292	227	65			
Lamech born,	874	774	639	549	479	414	252	187		
Adam dies,	930	800	695	605	535	470	308	243	56	
Enoch translated,	987	857	752	662	592	527	365	300	113	
Seth dies,	1042	912	807	717	647	582		355	168	
Noah born,	1056		821	731	661	596		369	182	
Enos dies,	1140		905	815	745	680		453	266	84
Cainan dies,	1235			910	840	775		548	361	179
Mahalaleel dies,	1290				895	830		603	416	234
Jared dies,	1422					962		735	548	366
Japhet born,	1556							869	682	500
Shem born,	1558							871	684	502
Lamech dies,	1651							964	777	595
Methuselah dies,	1656							969		600
The Flood,										

III. CHRONOLOGICAL TABLE of the YEARS of the PATRIARCHS according to the COMPUTATION of the SEPTUAGINT.

	Years of the world.	Years of Seth.	Years of Enos.	Years of Cainan.	Years of Mahalaleel.	Years of Jared.	Years of Enoch.	Years of Methuselah.	Years of Lamech.	Years of Noah.
Adam created,	1									
Seth born,	230									
Enos born,	435	205								
Cainan born,	625	395	190							
Mahalaleel born,	795	565	360	170						
Adam dies,	930	790	495	305	135					
Jared born,	960	730	525	335	165					
Enoch born,	1122	892	687	497	325	162				
Seth dies,	1142	912	707	517	347	182				
Methuselah born,	1387		852	662	492	327	165			
Enos dies,	1340		905	715	545	380	218			
Lamech born,	1474			849	679	514	352	187		
Enoch translated,	1487			862	692	527	365	200		
Cainan dies,	1535			910	740	575		248	61	
Noah born,	1662				867	702		375	188	
Mahalaleel dies,	1690				895	730		403	216	28
Jared dies,	1922					962		635	448	260
Japhet born,	2162							875	688	500
Shem born,	2164							877	690	502
Lamech dies,	2227							940	753	565
Methuselah dies,	2256							969		594
The Flood,	2262									600

Some think that Moses, being now about to mention the wickedness of the Antediluvians, introduces the posterity of Cain as being the chief cause of their corruption; and that he styles them *men* and *daughters of men*, because they were sensual and earthly, in which sense the word *men* is sometimes used in the scriptures. These words, "The sons of God saw the daughters of men that they were fair; and they took them wives of all that they chose," have given rise to many ridiculous comments both of Jews and Christians. Two interpretations may be mentioned as the most probable. When the name of God is added to any thing, it not only denotes being the efficient cause, but it heightens and increases its usual meaning. For which reason any thing excellent in its kind, or uncommonly lofty, was by the Jews said to be of God, or of the Lord. Thus the cedars of Lebanon are called the *cedars of the Lord*; and great mountains, the *mountains of God*. Therefore by the *sons of God* in this place are meant men of great opulence, power, and authority. And by way of contrast, the historian introduces those of poor and mean circumstances in life, and calls them the *daughters of men*. The words thus explained, are not an unlikely description of that dissolute age. The great and mighty in this world are commonly most addicted to sensual gratifications, because they have so many incentives to inflame their passions, and so few restraints to curb them; and, instead of using their power to punish and discountenance vice, are too often the greatest examples and promoters of lasciviousness and debauchery. Thus, these *sons of God*, these great men, when they happened to meet with the daughters of their inferiors, gazed on them as fit objects to gratify their lust; and from among these they *took to themselves*, in a forcible manner, *wives*, or (as it may be rendered) *concubines*, of all that they chose, whether married or unmarried, without ever asking their consent. No wonder then that the earth should be *filled with violence*, when the highest ranks of men were above the restraint of law, reason and religion, and not only oppressed the poor, but with impunity treated them and their children in such a base and tyrannical manner. But others cannot relish this interpretation, as they think it quite unscriptural, to call great and powerful persons the *sons of God*, and all mean and plebeian women the *daughters of men*. Besides, the text does not say, that the sons of God offered any violence to these inferior women; but that they saw that they were *fair*, and made choice of them for wives. And they justly argue, that there is no moral turpitude in men of superior rank or riches, marrying their inferiors: and therefore it is absurd to suppose such unequal matches, among the rich and poor, children of the same common parent, a sufficient cause for bringing upon the world an universal destruction. For these reasons many are of opinion, that the descendants of Seth, who were styled the *sons of God*, on account of their superior sanctity, fell in love with the *daughters of men*, the impious progeny of Cain, and by intermarriages became associated with them; and surrendering themselves to the charms of the daughters, they surrendered at the same time their vir-

tue and their religion. From this union proceeded effects similar to what has happened ever since. When a pure society mixes with a profane, the good principles of the one soon become tainted by the bad practices of the other, and thus it is probable, that the great source of universal degeneracy was owing to the posterity of Seth mingling with the progeny of Cain, in opposition to what their pious father had strictly charged them to do. Moses next tells us, that "there were giants in those days," and that the products of these marriages were "mighty men, and men of renown." Translators are not agreed about the meaning of the word *giants*. Some render the word, *violent and cruel men*; others, men who *fall upon and rush forward*, as a robber does upon his prey; the meaning then is, that they were not more remarkable for their strength and stature, than for their violence and cruelty. It is generally agreed that in the first ages of the world, men were of gigantic stature; though Moses does not mention them as giants till after the union of the families of Seth and Cain, when men used their superiority in bodily strength for the purposes of gratifying their worst passions. At this period of the world, and long after, political power and bodily strength went hand in hand. Whoever was able to encounter a fierce wild beast and clear the country of noxious animals, or in the day of battle to destroy most of his enemies, was looked upon by the rest of his companions as the fittest to be their commander. Thus, Nimrod, from being a *mighty hunter*, became a great monarch; and it appears from history, that all his successors have pretty nearly trodden in the same path. These *giants*, then, might be the chief warriors who formed themselves into chosen bands, and living among a cowardly and effeminate people, had no curb to their cruelty and lust. From them might spring an illegitimate race, resembling their fathers in body and mind, who, when they grew up, having no inheritance, would be turned loose upon the world, and follow no other employment but rapine and plunder. Thus they became *mighty men and men of renown*, and procured themselves a name, by the same means, that most heroes have procured a name in history by the mischiefs they did, and the numbers of their fellow mortals whom they murdered. Mankind running thus headlong into all manner of vice, were admonished to repent; for which purpose, they were not only allowed sufficient space (120 years) but repeatedly warned by Noah, who is described by the Apostle Peter, as a preacher of righteousness; and who alone, amidst this general corruption, was found to be just and perfect in his generation. But all he could do was to no purpose. They continued incorrigibly obstinate; so that at length, (as Josephus tells us) finding himself and family in imminent danger of personal violence, he departed from among them with his wife and children. This is extremely probable; for Moses assures us, "that the wickedness of man was great in the earth, that every imagination of the thoughts of his heart was continually evil;" and that "the earth was corrupt and filled with violence, all flesh having corrupted its way upon the earth." These words leave no

and that, when he had provided every thing, and was asked whither he was sailing, he should answer, *To the gods, to pray for happiness to mankind.* Xifuthrus did not disobey; but built a vessel, whose length was five furlongs, and breadth two furlongs. He put on board all he was directed; and went into it with his wife, children, and friends. The flood being come, and soon ceasing, Xifuthrus let out certain birds, which finding no food, nor place to rest upon, returned again to the ship. Xifuthrus, after some days, let out the birds again; but they returned to the ship, having their feet daubed with mud: but when they were let go the third time, they came no more to the ship, whereby Xifuthrus understood that the earth appeared again; and thereupon he made an opening between the planks of the ship, and seeing that it rested on a certain mountain, he came out with his wife, and his daughter, and his pilot; and having worshipped the earth, raised an altar, and sacrificed to the gods, he and those who went out with him disappeared. They who were left behind in the ship, finding that Xifuthrus and the persons that accompanied him did not return, went out themselves to seek for him, calling him aloud by his name; but Xifuthrus was no more seen by them: only a voice came out of the air which enjoined them, as their duty was, to be religious; and informed them, that on account of his own piety he was gone to dwell with the gods, and that his wife and daughter and pilot, were partakers of the same honour. It also directed them to return to Babylon, and that, as the fates had ordained, they should take the writings from Sippara, and communicate them to mankind; and told them, that the place where they were was the country of Armenia. When they had heard this, they offered sacrifice to the gods, and unanimously went to Babylon; and when they came thither, they dug up the writings at Sippara, built many cities, raised temples, and rebuilt Babylon. The Egyptians, who would give place to no nation in point of antiquity, have also a series of kings, who, it is pretended, reigned in Egypt before the flood; and, to be even with the Chaldeans, began their account the very same year that theirs does according to Berosus. There was an ancient chronicle extant among the Egyptians, not many centuries ago, which contained 30 dynasties of princes, who ruled in that country, by a series of 113 generations, through an immense space of 36,525 years, during which Egypt was successively governed by three different races; of whom the first were the Auvitzæ, the second the Mestæi, and the third the Egyptians. But this extravagant number of years Manetho (to whose remains we must chiefly have recourse for the ancient Egyptian history) has not adopted, however in other respects he is supposed to have been led into errors in chronology, by this old chronicle, which yet seems to have been a composition since Manetho's time. The account given by Berosus, if not taken from the writings of Moses, is at least

and upon some traditional account of the
 9s; and in that view, might be held as a
 corroborative evidence of their authenticity
 they needed any. But we have another

account of the first ages of mankind, in which no mention is made of the flood at all. This is contained in some fragments of a Phœnician author, called *Sanchoniatho*, who is said by some to have been cotemporary with Gideon, by others to have lived in the days of king David; while some boldly assert there never was such a person, and that the whole is a fiction of Philo-Biblus in opposition to the books of Josephus written against Apion; which is extremely probable.

(9.) ANTEDILUVIANS, STATE OF THE ARTS &c. AMONG THE. Of the customs, policy, and other general circumstances of the Antediluvians we can only form conjectures. All that we know even of their religious rites, is, that they offered sacrifices very early, both of the fruits of the earth, and of animals; but whether the blood and flesh of the animals, or only their milk and wool were offered, is a disputed point. Of their arts and sciences, we have not much more to say. The Antediluvians seem to have spent their time rather in luxury and wantonness, to which the abundant fertility of the first earth invited them, than in discoveries or improvements, which probably they stood much less in need of than their successors. The art of working metals was found out by the last generation of Cain; and music, which they might be supposed to practice for their pleasure, was not brought to any perfection, before the same generation. Some authors have supposed astronomy to have been cultivated by the Antediluvians, though this is probably owing to a mistake of Josephus: but it is to be presumed, the progress they made therein, or in any other science, was not extraordinary; it being even very doubtful, whether letters were so much as known before the flood. See ALPHABETICAL CHARACTERS, § 1, 3. As to their politics and civil constitutions, we have not so much as one circumstance, whereon to build a conjecture. It is probable, the patriarchal form of government, which certainly was the first, was set aside when tyranny and oppression began to take place, and much sooner among the race of Cain, than that of Seth. It seems also, that the communities were but few, and consisted of very large numbers of people than any former since the flood: or rather, it is a question, whether, after the union of the two great families of Seth and Cain, there were any distinction of civil societies, or diversity of regular governments, at all. It is more likely, that all mankind then made but one great nation, though living in a kind of anarchy, divided into several disorderly associations; which, as it was almost the natural consequence of their having, in all probability, but one common language, so it was a circumstance which greatly contributed to that general corruption, which otherwise perhaps could not have universally overspread the Antediluvian world. And for this reason chiefly, as it seems, so soon as the posterity of Noah were sufficiently increased, a plurality of tongues was introduced, in order to divide them into distinct societies, and thereby prevent any such total depravation for the future. See CONFUSION OF TONGUES. Of the peaceful and happy condition of the Antediluvians, as well as of their virtuous and harmonious manners,

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other general circumstances
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IT LONGEVITY OF
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increased in num-
ber, before the flood
were considered as

inhabitants, even supposing
the. Hence they conclude, that God extended
only the lives of the patriarchs, to such an extra-
ordinary length. But most writers maintain the
longevity of mankind in general in the early
world, not only upon the authority of sacred,
but likewise of profane history. And for such a
constitution, the moral reasons are abundantly ob-
vious. When the earth was wholly unpeopled,
except by one pair, it was necessary to endow
man with a stronger frame, and to allow them a
longer continuance upon earth, for peopling it
with inhabitants. In the infant state of every
mechanical art, relating to tillage, building, clo-
thing, &c. it would require many years experi-
ence, to invent proper tools and instruments
to ease men of their labour, and by uninter-
mitted essays and experiments to bring their inven-
tions to any degree of maturity and perfection.
Every part of their work must have been exceed-
ingly tedious from such a paucity and coarseness
of tools, and must have required longer time, and
more strength of body than afterwards, when me-
chanical knowledge was introduced into the
world. If parents at this period had not con-
stantly lived with their children, to have taught
them the art of providing for themselves, and
have defended themselves from the attacks of wild
beasts, and from other injuries to which they
were exposed, many families would have been
totally extinguished. But one of the best and
most valuable eras which longevity would suffer
was, the transmitting of knowledge, particularly
of religious knowledge to mankind. And thus,
before writing was invented, or any such easy and
durable mode of conveyance was found out, a
very few men served for many generations to in-
struct their posterity, who thus would not be as
loose to consult living and authentic records. The
natural causes of this longevity are variously as-
signed. Some have imputed it to the sobriety of
the Antediluvians, and the simplicity of their
diet; alleging, that they had none of those pro-
vocations to gluttony, which wit and vice have
since invented. Temperance might undoubtedly
have some effects, but not possibly to such a de-
gree. There have been many temperate and ab-
stemious persons in later ages, who yet seldom
have exceeded the usual period. Others have
thought, that the long lives of those inhabitants
of the old world proceeded from the strength of
their frames, or first principles of their bodily
constitutions; which might, indeed, be a concu-
rrent, but not the sole and adequate cause of their
longevity; for Shem, who was born before the
deluge, and had all the virtue of the antediluvian
constitution, fell 300 years short of the age of his
forefathers, because the greater part of his life
was passed after the flood. Others have imputed
the longevity of the Antediluvians to the excellen-
cy of their fruits, and some peculiar virtue in the
herbs and plants of those days. But to this sup-
position, it has been objected, that as the earth
was cursed, immediately after the fall, its pro-
ductions, we may suppose, gradually decreased
in their virtue and goodness, till the flood; and
yet, we do not see the length of man's lives de-
creased considerably, if it fell, during that inter-
val.

val. Waving this objection, as the import of the curse is variously interpreted, it appears certain, that the productions of the earth were at first, and probably continued, till after the deluge, of a different nature, from what they were in future times. Buffon supposes this difference may have continued gradually to diminish, for many ages subsequent to that catastrophe. The surface of the globe, (according to his theory,) was, in the first ages of the world, less solid and compact; because, gravity having acted only for a short time, terrestrial bodies had not acquired their present density and consistence.—The produce of the earth therefore, must have been analogous to its condition. The surface being more loose and moist, its productions would of course be more ductile and capable of extension: Their growth, therefore, and even that of the human body, would require a longer time of being completed. The softness and ductility of the bones, muscles, &c. would probably remain for a longer period, because every species of food was more soft and succulent. Hence, the full expansion of the human body, or when it was capable of generating, must have required 120 or 130 years; and the duration of life would be in proportion to the time of growth, as is uniformly the case at present: For if we suppose the age of puberty, among the first races of men, to have been 130 years, as they now arrive at that age in 14 years, the age of the Antediluvians will be in exact proportion to that of the present race; since by multiplying these two numbers by seven, for example, the age of the present race will be 90, and that of the Antediluvians will be 910. The period of man's existence; therefore, may have gradually diminished in proportion as the surface of the earth acquired more solidity by the constant action of gravity: and it is probable, that the period from the creation, to the days of David, was sufficient to give the earth all the density it was capable of receiving from the influence of gravitation; and consequently that the surface of the earth has ever since remained in the same state, and the terms of growth in the productions of the earth, as well as the duration of life, have been invariably fixed from that period. It has been further supposed, that a principal cause of the longevity under consideration was the wholesome constitution of the Antediluvian air, which, after the deluge, became corrupted and unwholesome, breaking, by degrees, the pristine crasis of the body, and shortening men's lives, in a very few ages, to near the present standard. The temperature of the air and seasons before that catastrophe are upon very probable grounds supposed to have been constantly uniform and mild: the burning heats of summer and the severities of winter colds were not then come forth, but spring and autumn reigned perpetually together: And indeed, the circumstance above all others most conducive to the prolongation of human life in the postdiluvian world appears to be an equal and benign temperature of climate, (see LONGEVITY); and it seems reasonable to infer, that the same might have produced the same effect in the diluvian world.

ANTEDILUVIANS, VAST PROBABLE NUM-

It is highly probable that, the Ante-

diluvian world was stocked with a much greater number of inhabitants than the present earth either actually does, or perhaps is capable of containing or supplying. This seems naturally to follow from the great length of their lives, which exceeded the present standard of life in the proportion, least, of ten to one, the Antediluvians must accordingly in any long space of time double themselves, at least in about the tenth part of the time in which mankind do now double themselves. It has been supposed that they began to get children as early, and left off as late, in proportion to men do now; and that the several children of the same father succeeded as quickly one after another as they usually do at this day; and as many generations, which are but successive with us, were contemporary before the flood, the number of people living on the earth at once would be that means sufficiently increased to answer the defect which might arise from other circumstances not considered. So that, if we make a computation on these principles, we shall find, that there was a considerable number of people in the world at the death of Abel, though their father Adam was not then 130 years old; and that the number of mankind before the deluge would easily amount to above one hundred thousand millions (even according to the Samaritan chronology), that is, twenty times as many as our present earth has, all probability, now upon it, or can be well supposed capable of maintaining in its present constitution. The following table drawn up on these principles by Mr Whiston, shews what number of people probably were in the Antediluvian world.

Series.	Year of doubling.	Year of the world.	Number of mankind.
1	2	2	4
2	4	6	8
3	6	12	16
4	8	20	32
5	10	30	64
6	12	42	128
7	14	56	256
8	16	72	512
9	18	90	1024
10	20	110	2048
11	22	132	4096
12	24	156	8192
13	26	182	16,384
14	28	210	32,768
15	30	240	65,536
16	32	272	131,072
17	34	306	262,144
18	36	342	524,288
19	38	380	1,048,576
20	40	420	2,097,152
21	42	462	4,194,304
22	44	506	8,388,608
23	46	552	16,777,216
24	48	600	33,554,432
25	50	650	67,108,864
26	52	702	134,217,728
27	54	756	268,435,456
28	56	812	536,870,912

Series

All which commonly bear a proportion to the whole term of life. Now the limits of these several stages cannot be precisely the same in all, but vary in respect of the dispositions of men's bodies, their course of life, and also the places and ages in which they live. In the Antediluvian world then, when men lived to upwards of 800 and 900 years, can it be thought that they passed through the several stages of life in as short a time as men do now, who seldom exceed 80, and not one in ten arrives at that age? But if the Antediluvians arrived at puberty as soon as men do now, then would the several stages of human life have been lost or confounded, and men would have started from childhood to manhood at once, without any due or regular intervals, contrary to the order of nature: But if, according to the present œconomy of nature, man is but a youth at 20, which is a fourth part of our term of life, we may reasonably conclude, there would be a suitable proportion of years in a much longer term of life, since nature is constant and uniform in her operations. And though in so long a life as the Antediluvians enjoyed, the time of puberty might be a fifth or a sixth part of their term of life, yet would they be but youths at 150 or 160; which bears much the same proportion to the whole of their life as twenty is to that of ours. The other is an error, he thinks, which could never have been fallen into, had it been considered, that every mother suckled her own children in those early days; and indeed where could she have found another to have done it for her? Taking it for granted, then, that it was an universal custom for women to suckle their children as well before as after the flood, the next question is, for how long time they continued nurses? He shows various instances, that when man's life was reduced to 120 or 140 years, the ordinary time of nursing was two years: he thence infers, that for three or four generations after the flood, when men lived to above 400 years, the time would be so much longer in proportion, and would not be less than three or four years; and consequently, that before the flood, when life was protracted to 800 or 900 years, it would be still longer in proportion to their longevity; so that five years might be the ordinary time of nursing in the Old World; and therefore that we cannot reckon less than six years between the births. For man's life being prolonged to so many hundred years at first for the more speedy peopling of the earth, he came by slow degrees to mature age, there being a long time required to rear up a body that was to last near 1000 years. The intervals therefore of infancy, childhood, youth, and mature age, were so much longer in proportion to ours, as the difference is between our term of life and theirs; and 150 or 160 years, with respect to their longevity, was no more in proportion than 20 is to the brevity of our life. As the Antediluvians therefore were so very long in growing up to mature age, he concludes that the time of nursing could not be shorter than five years, and that the distance between the births in a regular way must be set at six years. Upon the whole, he thinks it evident that there could be no such speedy increase of mankind at the beginning as is imagined; that

the time of nursing above specified was no more than necessary for that strength of constitution which was to last for 800 and 900 years; and the women who were to continue bearing children to 340 or 360 years of their life, should have the time but slowly, and at the distance of several years, that their strength might hold out, and that they might not be overburthened with too many children at once; and therefore, when Eve's first child was six years old, it was time enough for her to have another, and so on, though possibly sometimes twins." He then proceeds, 1. "To compute what number upon the whole might be born in the world from the creation to near the time of the deluge; and then, 2. To state the necessary deductions for deaths and other deficiencies. How long the parents of mankind continued in paradise, we know not; though longer perhaps than is commonly imagined. We shall even suppose 2 or 3 years, in which time there was no child born, nor any attempt towards it. We shall allow them 2 or 3 years more to lament their fall, and the miserable estate their want of faith and disobedience had brought them to, from a most happy condition; and suppose Cain to be born 10 years after the creation (in which supposition few probably, will be apt to think us too hasty, and Abel again six years after him, and so every sixth year Eve to have had a child, the first five, seven, eight or nine whereof were probably males (the males being longer in coming to maturity than the females;) and this distance between the births will also be thought a sufficient allowance. At this rate of increase, Adam would have in 100 years 16 children, in 200 years 32 and in 400 years 64 children; when we will suppose Eve to have left off child bearing. Nor need this number of Adam's children be thought too great, when there are instances in these later ages, and this short period of man's life, of those who have had 40 children at single births by two successive wives, and of many others who have had 20, 25, and 30, by one wife; though in such cases it is not to be supposed that the women suckled their children. 2. Though it is reasonable to think that the Antediluvians, notwithstanding their longevity, came to mature age at 150; yet as we are not sure that they all married so soon as they were ripe for marriage, and that the earliest in the genealogies is born in the 162nd year of his father, who might probably be a first-born, our author does not suppose Cain, Abel or any of the succeeding children or grand-children of Adam to have married till they were 160, but to have had children from 161 or 162 till they were of the age of 500, at the fore-named distance or interval between the births; though Noah every body knows had three sons after he was 500 at the due intervals. And to all the Antediluvians we may allow, without fear of exceeding, 50 or 54 children in general, according to the course of nature, and the longevity of those first ages of the world. 3. Let us next inquire in what number of years the men of that world might double themselves, notwithstanding the long interval between the births. The increase indeed will be found very small for the first 300 or 400 years, as they were late in coming to maturity; but the succeeding

3. Abel, married in	171
supposed to have been same	215
4. Adam's 3d son, married in	178
5. Adam's 4th son, married in	182
6. Adam's 5th son, married in	190
7. Adam's 6th son, married in	196
8. Adam's 7th son, married in	203

(14.) **INTERMEDIARIES UNDER-ESTIMATE THE REASONING CALCULATION.** To the above 33 married pairs, might be added the produce of the remaining 4 pairs, all born before the year 541, and marriagable in the year 500, which would very much increase the number of mankind. And thus, the reader may perceive that we have been far from building on uncertain foundations, since we have omitted 33 pairs more; and which we might have taken into the account. And if it be considered that the command given to Adam was to increase and multiply and replenish the earth, doubt can be made, how many men and women and children would be fruitful in the procreation of children that the earth might be inhabited. We may add to these considerations, that, in the whole of the above calculations, (p. 15, 16, 17) Mr Cockburn has gone far below even probability; and, left his calculations should be reckoned too high, has taken for granted some things without evidence, and based others in opposition to fact.

* **ANTENUMBER**. *n. f.* [from *ante* and *num-*
ber.] The number that precedes another.—What-
soever virtue is in numbers, for conducing to con-
sent of notes, is rather to be ascribed to the *ante-*
number, than to the entire number, so that the
found returneth after six, or after twelve; so that
the seventh or thirteenth is not the matter, but
the sixth or the twelfth. *Bacon*.

ANTENUPTIAL, something that precedes
marriage; such as antenuptial promises, antenupt-
tial presents, antenuptial covenants, antenuptial
fornication, &c. Neostadius has a treatise *De Pac-*
tis Antenuptialibus. Dr Johnson has omitted this
word as well as many others, which are more cur-
rently used than many that he has inserted in his
Dictionary.

ANTEPAGMENTA, in the ancient architec-
ture, the jambs of a door. They are also orna-
ments, or garnishings, in carved work, of men,
animals, &c. made either of wood or stone, and
set on the architrave.

* **ANTEPAST**. *n. f.* [from *ante*, before, and *pas-*
tum, to feed. A foretaste; something taken be-
fore the time.—Were we to expect our bliss only
in the satiating our appetites, it might be reason-
able, by frequent *antepasts*, to excite our gust for
that profuse perpetual meal. *Decay of Piety*.

ANTEPECTORALIS MURUS. See **ANTEMU-**
RALE, No 1.

* **ANTEPENULT**. *n. f.* [*antepenultima*, Lat.]
The last syllable but two, as the syllable *te* in *ante-*
penult; a term of grammar.

ANTEPENULTIMA, or } See last article.
ANTEPENULTIMATE. }

ANTEPILANI, among the ancient Romans,
the *basilati* or *principes* of a legion. They are sup-
posed to have been thus called because ranged be-
fore the *pilani*, or *triararii*.

(1.) * **ANTEPILEPTICK**. *adj.* [*αἰὲ* and *ἐπι-*
λεψ] A medicine against convulsions.—That be-
zezar is antidotal, lapis judaicas diuretical, coral *an-*
tepiletical, we will not deny. *Brown's Vul. Errs.*

(2.) **ANTEPILEPTICS**, in medicine, are chiefly
the roots of pœony, valerian, the flowers of the
lime tree, mistletoe of the oak, opium, musk, cam-
phor, æther, volatile alkali, and the aromatics in
general.

* **To ANTEPONE**. *v. a.* [*antepono*, Lat.] To set
one thing before another; to prefer one thing to
another. *Diſt.*

ANTEPOSITION, a grammatical figure, where-
by a word, which by the ordinary rules of syntax
ought to follow another, comes before it; as when
the verb is put before the nominative, the substan-
tive before the adjective, &c. This figure was
frequently among the Greeks and Latins, whose
language by its variety of terminations admitted
of the artificial order, without confounding the
sense of the words; but in the English and most
modern languages, where the natural order is ne-
cessarily used; it is very seldom adopted; except
in such expressions as *ſaid I*, *quoth he*, and the like.

* **ANTEPREDICAMENT**. *n. f.* [*antepredica-*
mentum, Lat.] Something to be known in the
study of logick, previously to the doctrine of the
predicament.

(1.) **ANTEQUIERA**, a handsome town of
Spain, anciently called *Singilium*, in Granada,

divided into two parts: 1. The **UPPER ANTEQUI-**
ERA is seated on a hill, and has a castle. 2. The
LOWER stands in a fertile plain, and is watered
with a great number of brooks. There is a large
quantity of salt in the mountain; and five mile
from the town, a spring famous for the cure of
the gravel. The remains of the mines, whence
the Romans drew immense quantities of gold and
silver, are still to be seen. It is situated 26 miles
N. of Mahaga. Long. 4. 40. W. Lat. 36. 51. N.

(2.) **ANTEQUIERA**, a town of America, in New
Spain, in the province of Guaxaquia, 75 miles
S. E. of Guaxaquia.

ANTER-CHESTER, a village in Northumber-
land, near Learmouth.

ANTERIDES, in the ancient architecture, bu-
tresses erected to support a wall. They were also
called *antes*, sometimes *crisma*, and by the
Greeks *ἐπιστήρα*. They answer to what the mo-
dern builders call *counterforts*, *archbutants*; the
Italians *barbicanes*, and *ſperoni*, or spurs.

* **ANTERIORITY**. *n. f.* [from *anteriour*.] Pri-
ority; the state of being before either in time or
situation.

* **ANTERIOUR**. *adj.* [*anterior*, Lat.] Going
before, either with regard to time or place.—
That be the *anteriour* or upper part, wherein the
senses are placed, and that the posterior and
lower part, which is opposite thereunto, there
be no inferiour or former part in this animal; in
the senses being placed at both extremes, make
both ends *anteriour*, which is impossible. *Brown's*
Vulgar Errours.

ANTEROS, in mythology, one of the two
Cupids, who were the chief of the number.—
They are placed at the foot of the Venus of Me-
dici; this is represented with a heavy and sulle-
look, agreeably to the poetical description of
him, as the cause of love's ceasing. The other
was called Eros.

ANTEROTES, a name given by some of the
ancient writers on gems to a species of the ame-
thyst. Some have imagined they meant by it
sort of opal; but Pliny expressly contradicts this
making the anterotes the fifth kind of amethyst,
in value.

* **ANTES**. *n. f.* [Latin.] Pillars of large di-
ameter that support the front of a building.

ANTESIGNANI, in the Roman armies, sold-
iers placed before the standards, to defend them
according to Liraprius; but Cæsar and Livy men-
tion the antesignani as the first line, or first body
of heavy armed troops. The velites, who used
to skirmish before the army, were likewise called
antesignani.

ANTESTATURE, in fortification, a small re-
trenchment made of palisadoes, or sacks of earth,
with a view to dispute with an enemy the remain-
der of a piece of ground.

ANTESTARI, in Roman antiquity, signified
to bear witness against any one who refused to
make his appearance in the Roman courts of ju-
dication, on the day appointed, and according
to the tenor of his bail. The plaintiff, finding
the defendant, after such a breach of his engage-
ment, was allowed to carry him into court by
force, having first asked any of the persons pre-
sent to bear witness. The person asked to bear
witness

propagated from seeds sown in the spring, and will require no other care than to be kept free from weeds: only, the tinctoria must be transplanted when come up from the seeds into borders near shrubs, where they may have room to grow; for they spread very wide, and therefore require to be placed three feet distant from other plants.

(II.) ANTHEMIS, MEDICINAL USES OF THE. The nobilis and the pyrethrum (see N° 2, and 3,) are chiefly used in medicine. The first have a strong, not ungrateful, aromatic smell, and a very bitter nauseous taste. They are accounted carminative, aperient, emollient, and in some measure anodyne; and stand recommended in flatulent colics, for promoting the uterine purgations, in spasmodic pains, and the pains of childbed women: sometimes they have been employed in intermittent fevers and the nephritis. These flowers are frequently also used externally in discutient and antiseptic fomentations, and in emollient glysters. They enter the *decoctum pro enemate* and *decoctum pro fomento* of our pharmacopœias. An essential oil was formerly directed to be prepared from them, but it is now omitted. A simple watery infusion of them taken in a tepid state, is at present frequently employed to promote the operation of emetics. The root of the pyrethrum is the only part endowed with medical virtue. It has no sensible smell; its taste is very hot and acrid, but less so than that of arum or dracunculus: the juice expressed from it has scarce any acrimony, nor is the root itself so pungent when fresh, as after it has been dried. Water, assisted by heat, extracts some share of its taste, rectified spirit the whole; neither of them elevate any thing in distillation. The principal use of the pyrethrum, in the present practice, is as a masticatory, for promoting the salival flux, and evacuating viscid humours from the head, and neighbouring parts; by this means, it often relieves the tooth-ach, pains of the head, and lethargic complaints.

ANTHERA, among botanists, that part of the stamen which is fixed on the top of the filamentum, within the corolla: it contains the pollen or fine dust, which, when mature, it emits for the impregnation of the plant, according to Linnæus. The APEX of Ray, Tournefort and Rivinus; *Capula staminis*, of Malpighi.

ANTHERICUM, SPIDER-WORT: A genus of the monogynia order, belonging to the hexandria class of plants; and, in the natural method, ranking under the 10th order, *Coronariæ*. The characters are: There is no calyx: The corolla consists of six oblong petals, which are expanding: The stamina consist of six subulated erect filaments; the antheræ are small and furrowed: The pistillum has a three-cornered germen, a simple stylus, and obtuse stigma: The pericarpium is an ovate trifurcated capsule, with three cells and three valves: The seeds are numerous and angular. Of this genus Linnæus reckons 9 species; but only the three following seem to deserve notice.

1. ANTHERICUM FRUTESCENS, with a shrubby stalk, was formerly known among the gardeners near London by the name of *onion-leaved aloe*. It produces many ligneous branches from the root, each supporting a plant with long taper leaves, in those of an onion, and full of a yellow

pulp very juicy. These plants send out roots, which run down and fasten themselves into the earth, by which they multiply greatly. The flowers are produced on long loose spikes, are yellow, and appear at different times, so that the plants are never long destitute of flowers. This species is a native of the Cape of Good Hope, and requires shelter in winter, though some will live in the open air planted close to a wall.

2. ANTHERICUM LILIAGO: These are perennial plants, which are natives of Spain, Portugal, and other warm countries. They were formerly pretty common in the English gardens; but the severe winter of 1740 killed most of their roots. They flower in June and July, and the seeds are ripe in September.

3. ANTHERICUM RAMOSUM, with a branching stalk. These two last species are propagated by seeds, which should be sown in the autumn, in a warm situation, on a bed of light sandy earth. When the plants come up they must be kept clear of weeds during the summer; and in autumn when the leaves decay, they should be carefully taken up and transplanted into a bed of light earth, at a foot distance from one another. If the winter prove severe, they should be covered with straw, pease-haulm, or old tan.

ANTHESPHORIA, in antiquity, a Sicilian festival instituted in honour of Proserpine. The word is derived from the Greek *ανθος*, flower, and *φέρω*, I carry; because that goddess was forced away by Pluto when she was gathering flowers in the fields. Yet Festus does not ascribe the festival to Proserpine; but says it was thus called by reason ears of corn were carried on this day to the temples.—Anthesphoria seems to be the same with the *florifertum* of the Latins, and answer to the harvest-home among us.

ANTHESTERIA, in antiquity, was a feast celebrated by the Athenians in honour of Bacchus. The most natural derivation of the word is from the Greek *ανθος*, *flor*, a flower, it being the custom at this feast to offer garlands of flowers to Bacchus. The anthesperia lasted three days, the 11th, 12th and 13th of the month; each of which had a name suited to the proper office of the day. The first day of the feast was called *ανθισμια*, i. e. opening the vessels; because on this day they tapped the vessels, and tasted the wine. The second day they called *χρυσια*, *congi*, the name of a measure containing the weight of 10 pounds; on this day they drank the wine prepared the day before. The third day they called *κατὰ κηλεις*, kettles: on this day they boiled all sorts of pulse in kettles; which however they were not allowed to taste, as being offered to Mercury.

ANTHESTERION, in ancient chronology, the sixth month of the Athenian year. It contained 29 days; and answered to the latter part of November and beginning of December. The Macedonians called it *dashion* or *desion*. It had its name from the festival anthesperia kept in it.

ANTHIA, in zoology, a name by which some improperly call the *salx Venetorum*, or sickle-fish, a long anguilliform fish of the *tanja* kind.

ANTHIAS, in zoology, the name of a fish seeming to approach to the *turdus* or wrasse kind, which Rondeletius and some other authors have described.

his disciples or friars; one of which is the following, printed in Stephens's World of Wonders:

Once fedd'st thou, Anthony, an herd of swine,
And now an herd of monks thou feedest still.
For wit and gut alike both charges bin;
Both loven filth alike; both like to fill
Their greedy paunch alike: nor was that kind
More beastly, sottish, swinish, than this last.
All else agrees: one fault I only find,
Thou feedest not thy monks with oaken mast.

(4.) ANTHONY, ST, gives the denomination to an order of religious founded in France about the year 1095, to take care of those afflicted with St Anthony's fire: (see that article, § 7.) It is said, that, in some places, these monks assume to themselves a power of giving, as well as removing, the *ignis sacer*, or erysipelas; a power which stands them in great stead for keeping the poor people in subjection, and extorting alms. To avoid the menaces of these monks, the country people present them every year with a fat hog a-piece. Some prelates endeavoured to persuade Pope Paul III. to abolish the order; *questuarios istos sancti Anthonii, qui decipiunt rusticos et simplices, eosque innumeris superstitionibus implicent, de medio tollendos esse*. But they subsist, notwithstanding, to this day in several places.

(5.) ANTHONY, ST, KNIGHTS OF, a military order, instituted by Albert Duke of Bavaria, Holland, and Zealand, when he designed to make war against the Turks in 1382. The knights wore a collar of gold made in form of a hermit's girdle, from which hung a stick cut like a crutch, with a little bell, as they are represented in St Anthony's pictures.

(6.) * ANTHONY'S FIRE. *n. f.* A kind of erysipelas.

(7.) ANTHONY'S FIRE, ST, ORIGIN OF THE NAME OF. The erysipelas got this denomination, as those afflicted with it made their peculiar application to St Anthony of Padua for a cure. It is known, that anciently particular diseases had their peculiar saints: thus, in the ophthalmia, persons had recourse to St Lucia; in the tooth-ach, to St Apollonia; in the hydrophobia, to St Hubert, &c.

(8—13.) ANTHONY, the name of 6 English villages; viz. 1. EAST, and 2. WEST, in Cornwall, near Saltash: 3. EAST, and 4. WEST, near Fal-mouth: 5. in St Meney, near Helston-Downs, in Cornwall: and, 6. in Somersetshire, 8 miles from Somerton.

ANTHOPHYLLI, or ANTOPHALI, a denomination given to the larger species of cloves.

ANTHORA, in botany, the trivial name of a species of Aconitum. See ACONITUM.

ANTHORISMUS, in rhetoric, denotes a contrary description or definition of a thing from that given by the adverse party.—Thus, if the plaintiff urge, that to take any thing away from another without his knowledge or consent, is a theft; this is called *oppositio*, or definition. If the defendant reply, that to take a thing away from another without his knowledge or consent, provided it be done with design to return it to him again, is not theft; this is an *Antithesis*.

(1.) ANTHOS, [a flower, Gr.] by way of ex-

cellency appropriated to rosemary, so as to express only that plant.

(2.) ANTHOS, in chemistry, the quintessence or elixir of gold; or a medicine extracted from pearls.

(3.) ANTHOS PHILOSOPHURUM, a method of transmuting metals by means of vitriol.

ANTHOSMIAS, among ancient naturalists, a rich odoriferous kind of wine. It differs from *anthinos*, as the latter imports a medicated wine scented with odoriferous herbs, whereas anthosmias derived its fragrantcy from the native grapes.

ANTHOSPERMUM, the AMBER TREE: genus of the diœcia order, belonging to the polygamia class of plants, and in the natural method ranking under the 47th order, *Stellata*. The essential characters are: The calyx of the hermaphrodite flower is divided into four parts; there is no corolla; the stamina are four, and the pistil two; the germen is beneath the flower. Male and female on the same or separate plants. Of the genus Linnaeus mentions 3 species: viz.

1. ANTHOSPERMUM ÆTHIOPICA, } The first
2. ANTHOSPERMUM CILIARE, and } is most
3. ANTHOSPERMUM HERBACEA. } general
known in the gardens of the curious. Its beauty consists in its small evergreen leaves, which grow as close as heath. These being bruised between the fingers, emit a very fragrant odour; whence the name amber-tree. This plant is easily propagated by cuttings during any of the summer months, in a border of light earth; where they will take root in six weeks time, provided they are watered or shaded as the season may require; or if they are planted in pots plunged in a moderate hot-bed, they will take root the sooner, and there will be a greater certainty of their growing. The must be frequently renewed by cuttings, as the old plants are very subject to decay, and seldom last above three or four years.

ANTHOXANTHUM, or VERNAL-GRASS: genus of the digynia order, belonging to the didamia class of plants; and in the natural method ranking under the 4th order, *Gramina*. The essential characters are: The calyx is a bivalve gluma, with one flower; the corolla is bivalve, obtuse, and without any awn. There are three species; viz.

1. ANTHOXANTHUM INDICUM, a native of India.

2. ANTHOXANTHUM ODORATUM, or spring grass, a native of Britain: It is one of the earliest spring grasses, and is extremely common in our fertile pastures. The delightful smell of new mown hay is chiefly from this plant. Cows, horses, sheep, and goats eat it.

3. ANTHOXANTHUM PANICULATUM, a native of the southern parts of Europe.

ANTHRACIS, ANTHRACIAS, or ANTHRACIS, names promiscuously used by ancient naturalists for very different fossils; viz. the carbuncle, hæmatites, and a kind of asteria. See CARBUNCLE.

ANTHRACOSIS, in medicine, a corrosive scab or ulcer either in the bulb of the eye or the eye-lid.

(1.) * ANTHRAX. *n. f.* [αἰμαρ, a burning coal] A scab or blotch that is made by a corrosive humour, which burns the skin, and occasions smarting pricking pains, a carbuncle. *Quincy*.

(2.) ANTHRAX

and thickness, both considered in themselves, and comparatively to each other.

ANTHROPOMETRICA MACHINA, a name which Sanctorius gave to his weighing chair, contrived for measuring the quantity of insensible perspiration.

ANTHROPOMORPHA, a term formerly given to that class of animals which have the greatest resemblance to the human kind.

ANTHROPOMORPHISM, among ecclesiastical writers, denotes the heresy or error of the Anthropomorphites. See next article.

(1.) * **ANTHROPOMORPHITE**, *n. f.* [*ανθρωπομορφος*.] One who believes a human form in the Deity.—Christians as well as Turks have had whole sects contending that the Deity was corporeal and of human shape, though few profess themselves *anthropomorphites*, yet we may find many amongst the ignorant of that opinion. *Locke*.

(2.) **ANTHROPOMORPHITES**, in church history, a sect of ancient heretics, who taking every thing spoken of God in scripture in a literal sense, particularly that passage of Genesis in which it is said *God made man after his own image*, maintained that God had a human shape. They are likewise called *Audeni*, from Audeus their leader.

ANTHROPOMORPHITICAL, *adj.* belonging to Anthropomorphites.

ANTHROPOMORPHOUS, something that bears the figure or resemblance of a man. Naturalists give instances of anthropomorphous plants, anthropomorphous minerals, &c. These generally come under the class of what they call *lusus nature*, or monsters. Anthropomorphous stones make a species of figured stones. The word is applied to the mandrake.

(1.) * **ANTHROPOPATHY**. *n. f.* [*ανθρωπος*, man, and *παθος*, passion.] The sensibility of man; the passions of man.

(2.) **ANTHROPOPATHY**, in theology, a figure, expression, or discourse, whereby some passion is attributed to God, which properly belongs only to man. Anthropopathy is frequently used promiscuously with anthropology; yet, in strictness, they ought to be distinguished, as the genus from the species.—Anthropology may be understood of any thing human attributed to God; but anthropopathy, only of human affections, passions, sensations, &c.

(1.) **ANTHROPOPHAGI**. *n. f.* [*It has no singular. ανθρωπος*, man, and *φαγω*, to eat.] Man-eaters; cannibals; those that live upon human flesh.

The cannibals that each other eat,

The *anthropophagi*, and men whose heads

Do grow beneath their shoulders. *Shakesp. Oth.*

(2.) **ANTHROPOPHAGI**, ANCIENT ACCOUNTS OF. That there have been, in almost all ages of the world, nations who have followed this barbarous practice, we have abundance of testimonies. The Cyclops, the Lestrygons, and Scylla, are all represented in Homer as *anthropophagi*, or man-eaters; and the female phantoms, Circe and the Syrens, first bewitched with a shew of pleasure, and then destroyed. This, like the other parts of Homer's poetry, had a foundation in the manners of the times preceding his own. According

Herodotus, among the Etesdonian Scythians, a man's father died, the neighbours brought

several beasts, which they killed, mixed up the flesh with that of the deceased, and made a feast. Among the Massagetæ, when any person grew old, they killed him and eat his flesh; but if he died of sickness, they buried him, esteeming him unhappy. The same author also assures us, that several nations in the Indies killed all their old people and their sick, to feed on their flesh: he adds, that persons in health were sometimes accused of being sick, to afford a pretence for devouring them. According to Sextus Empiricus, the first laws that were made, were for the prevention of this barbarous practice, which the Greek writers represent as universal before the time of Orpheus. The philosophers Diogenes Chrysippus, and Zeno, followed by the whole sect of Stoics, affirmed, that there was nothing unnatural in the eating of human flesh; and that it was very reasonable to use dead bodies for food rather than to give them a prey to worms and putrefaction. In order to make the trial, however, whether there was any real repugnancy in nature to the feeding of an animal with the flesh of its own species, Leonardus Floroventius fed a hog with hog's flesh, and a dog with dog's flesh; upon which he found the bristles of the hog to fall out, and the dog to become full of ulcers.

(3.) **ANTHROPOPHAGI**, MODERN INSTANCES OF. Of the practice of anthropophagy in latter times, we have the testimonies of all the Roman missionaries who have visited the internal parts of Africa, and even some parts of Asia. Herodotus speaks of great markets in China, furnished wholly with human flesh, for the better sort of people. Marcus Paulus speaks of the like in his time, in the kingdom of Concha towards Quinsay, and the island of Zapengit; others, of the Java; Barbafa, of the kingdom of Siam and the island of Sumatra; others, of the islands in the Gulf of Bengal, of the country of the Samogitians, &c. When America was discovered, this practice was found to be almost universal, inasmuch that several authors have supposed it to be occasioned through a want of other food, or through the indolence of the people to seek for it; though others ascribe its origin to a spirit of revenge. It appears pretty certain from Dr Hawkesworth's Account of the Voyages to the South Seas, that the inhabitants of the island of New Zealand, a country unfurnished with the necessaries of life, eat the bodies of their enemies. It appears also to be very probable, that both the wars and anthropophagy of these savages take their rise and owe their continuance to irresistible necessity, and the dreadful alternative of destroying each other by violence, or of perishing by hunger. Mr Masden also informs us that this horrible custom is practised by the Battas, a people in the island of Sumatra. "They do not eat human flesh (says he) as a means of satisfying the cravings of nature, owing to a deficiency of other food; nor is it sought after as a gluttonous delicacy, as it would seem among the New Zealanders. The Battas eat it as a species of ceremony; as a mode of showing the detestation of crimes, by an ignominious punishment; and as a horrid indication of revenge and insult to their unfortunate enemies. The objects of this barbarous repast are the prisoners taken

short woolly pods, containing two or three kidney shaped seeds: but unless the season proves warm, they do not ripen in this country.

2. *ANTHYLLIS CYTISOIDES*, or shrubby woundwort, has long been known in the English gardens. It is a low shrub, seldom rising above two feet high, but sends out many slender branches, garnished with hoary leaves, which are sometimes single, but generally have three oval lobes, the middle being longer than the other two: the flowers are yellow, and come out from the sides of the branches, three or four joined together, having woolly impalements; but these are rarely succeeded by seeds in England. This species and the *barba jovis* may be propagated by cuttings planted during any of the summer months; observing to shade and water them till they have taken good root; when they are to be transplanted into pots, and must always be housed in winter.

3. *ANTHYLLIS MONTANA*, or herbaceous woundwort, with winged leaves, grows naturally in the mountains in the south of France, and in Italy. It is garnished with winged leaves, which have an equal number of hairy lobes at the extremity of the branches. The flowers are produced in heads, and are of a purple colour and globular form. They appear in June and July, and the seeds ripen in October.

4. *ANTHYLLIS VULNERARIA*, with unequal winged leaves, is a native of Spain and Portugal, as likewise of Wales. It is a biennial plant, having single leaves at bottom, which are oval and hairy; but those which grow out of the stalks are winged, each being composed of two or three pair of lobes terminated by an odd one. The flowers grow collected into heads at the top of the stalks, are of a bright scarlet colour, and make a pretty appearance. It flowers in June and July, and the seeds ripen in October. The two last species require no particular management further than being kept free from weeds.

* *ANTHYPNOTICK*. *adj.* [from *ανη*, against, and *υπνος*, sleep.] That which has the power of preventing sleep; that which is efficacious against a lethargy.

* *ANTHYPOCHONDRIACK*. *adj.* [from *ανη*, against, and *χονδριανος*.] Good against hypochondriack maladies.

ANTHYPOMOSIA, in ancient writers, an oath taken by a prosecutor or accuser, declaring that the absence of the party accused is not for any just cause, and therefore demanding that judgment may no longer be delayed on that account.

(1.) * *ANTHYPOPHORA*. *n. f.* [*αντιποψη*.] A figure in rhetoric, which signifies a contrary illation, or inference, and is when an objection is refuted or disproved by the opposition of a contrary sentence. *Smith's Rhetorick*.

(2.) * *ANTHYPOPHORA*, stands opposed to *hypophora*, e.g. If the *hypophora* be, grammar is indeed a little difficult to obtain; the *anthypophora* may be; grammar is indeed a little difficult to attain, but then its use is infinite. See *HYPOPHORA*.

* *ANTHYSTERICK*. *adj.* [from *ανη*, against, and *υστερικος*.] Good against hystericks.

) * *ANTI*. [*αντι*.] A particle much used in position with words derived from the Greek,

and signifies *contrary to*; as, *antimonarchical*, opposite to monarchy.

(2.) *ANTI*, in composition, is not confined to "words derived from the Greek." Dr Johnson himself, notwithstanding the above restricted definition, (§ 1.) gives instances of the contrary. See *ANTIACID*, *ANTICONVULSIVE*, *ANTICOURTIER*, *ANTIFEBRILE*, *ANTIPESTILENTIAL*, &c. In fact it is compounded with words in all the modern languages, often at the pleasure of authors, to save circumlocution. See § 3 & 4.

(3.) *ANTI*, in literary matters, often makes part of the titles of pieces written by way of answer to others, whose names are usually annexed to this preposition. See the *Anti* of M. Paillet; the *Anti-Baillet* of M. Menage: the *Anti-Menagiani*, &c. This practice among authors is very ancient. Cæsar the dictator wrote two books by way of answer to what had been objected to him by Cato which he called *Anti-Catones*; these are mentioned by Juvenal, Cicero, &c. Vives assures us, he had seen Cæsar's *Anti-Catones* in an ancient library.

(4.) *ANTI*, in religious and political controversy, frequently makes part of the distinctive title assumed by the parties themselves in such disputes, and is as often bestowed by the one party upon the other by way of contempt; e.g. *ANTI-BURGHERS*, *ANTI-PÆDOBAPTISTS*, *ANTI-REPUBLICANS*, *ANTIROYALISTS*, &c.

* *ANTIACID*. *adj.* [from *ανη*, and *acidus*, sour.] Contrary to sourness; alkalis.—Oils are *antiacid*, so far as they blunt acrimony; but as they are hard of digestion, they produce acrimony of another sort. *Arbutnot*.

ANTIADDES, in anatomy, the glandules, or kernels, more commonly called tonsils, and almonds of the ears.

ANTIADIAPHORISTS, opposite to the *ADIAPHORISTS*, [from *ανη*, and *διαφορος*, indifferent.] an appellation given, in the 14th century to the rigid Lutherans, who disavowed the episcopal jurisdiction, and many of the church ceremonies, retained by the moderate LUTHERANS.

ANTIAPHRODITICS. See *ANTAPHRODISIACS* and *ANTAPHRODITICK*.

ANTIARTHRITICS. See *ANTARTHRITICK*.

ANTIASTHMATICS. See *ANTASTMATIC*.

ANTIAXIOMATISM, that which is against any known axiom. *Bailey*.

ANTIBACCHIUS, in ancient poetry, a foot consisting of three syllables, the two first long and the last one short; such as the word *virtus*.

ANTIBALLOMENA, medicines which may be substituted for each other.

ANTIBARBARA, and } titles given to several works levelled against the use of barbarous terms and phrases, chiefly in the Latin tongue. Erasmus, Nizolius, and Celarius, have published *Antibarbara*. Noltenius's *Lexicon Anti-barbarum*, consisting of observations made by the grammarians of later ages in relation to the purity and corruption of Latin words. Sixtus Amama has given an *Antibarbarus Biblicus*, wherein he pretends to have discovered several sources of the barbarisms which have got footing of late ages in the Bible. Peter du Moulin uses

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consider of four expending points: The pericarpium is a capsule, above, bilobed, with four cells, and four valves: The seeds are very numerous. There is but one species, viz.
 ANTICHRISTUS, a native of Arabia.
 ANTICHRISTUS, in the civil law, a covenant or convention, whereby a person borrowing money of another, engages, or makes over his land or goods to the creditor, with the use and occupation thereof, for the interest of the money lent. This covenant was allowed of by the Romans; among whom usury was prohibited: it was afterwards called mortgage, so distinguish it from a simple engagement, where the fruits of the ground were not alienated, which was called usufruct.
 ANTICHRIST, among ecclesiastical writers, denotes a great adversary of Christianity, who is to appear upon the earth, towards the end of that world. There have been demonstrations, disquisitions, and proofs, in great number, both that the pope is, and that he is not Antichrist. Y. Cabot is very full in describing the father and mother of Antichrist, his tribe and pedigree, his wars and conquests, his achievements against Gog, Magog, &c. Some place his capital at Constantinople, others at Jerusalem, others at Moscow, and some at London; but the generality at Rome, though these last are divided. Grotius and four others suppose Rome Pagan to have been the seat of Antichrist, and Caligula or Nero the person; Most of the Lutheran and reformed doctors contend earnestly for Rome Christian, under the papal hierarchy. In fact, the point having been maturely debated at the council of Gap, held in 1661, a resolution was taken thereupon, to insert an article in the confession of faith, whereby the pope is formally declared to be Antichrist.—Pope Clement VIII. was strug with the quick with this decision; and even king Henry IV. of France was not a little mortified, to be thus declared, as he said, an *imp of Antichrist*. M. de Clerc holds, that the rebel Jews and their leader Simon, whose history is given by Josephus, are to be reputed as the true Antichrist. Lightfoot and Vanderhart rather apply this character to the Jewish Sanhedrim. Hippolytus and others held, that the devil himself was the true Antichrist, that he was to be incarnate, and make his appearance in human shape, before the consummation of all things.—Others, among the ancients, held, that Antichrist was to be born of a virgin, by some prolific power, imparted to her by the devil. A modern French writer, of the female sex, Madam Bonaparte, whom many hold for a saint, has improved on this sentiment; maintaining that Antichrist is to be begotten by the devil, on the body of a witch, by means of the semen of a man, caught in the commission of a certain crime, and conveyed, &c. Father Malvenda, a Jesuit, hath published a large work, intitled *Antichristus*, in which this subject is amply discussed. It consists of thirteen books. In the first, he relates all the opinions of the fathers with regard to Antichrist. In the second, he speaks of the times when he shall appear; and shows, that all the fathers, who supposed Antichrist to be near at hand, judged the world was near its period. In the third, he discusses of his origin and nation; and shows

that he is to be a Jew, of the tribe of Dan: this he founds on the authority of the fathers; on the passage in Genesis xlix. 17. *Dan shall be a serpent by the way, &c.*; on that of Jeremy viii. 16. where it is said, *The armies of Dan shall devour the earth*; and on Rev. vii. where St John, enumerating all the tribes of Israel, makes no mention of that of Dan. In the fourth and fifth books, he treats of the signs of Antichrist. In the sixth, of his reign and wars. In the seventh, of his vices. In the eighth, of his doctrine and miracles. In the ninth, of his persecutions: and in the rest, of the coming of Enoch and Elias, the conversion of the Jews, the reign of Jesus-Christ, and the death of Antichrist, after he has reigned three years and an half. See also *Lowman on the Revelation*. Hunnius and some others, to secure Antichrist to the pope, (notwithstanding that this latter seemed excluded, by not being of the tribe of Dan,) have broke in upon the unity of Antichrist, and assert, that there is to be both an eastern and a western Antichrist. How endless are conjectures? Some of the Jews, we are told, actually took Cromwell for the Christ; while some others have laboured to prove him Antichrist himself! Piaffius assures us, he saw a folio book in the Bodleian library, written on purpose to demonstrate this latter position. Upon the whole, the Antichrist mentioned by the apostle John, 1 Eph. ii. 18. and more particularly described in the book of Revelation, seems evidently to be the same with the *Man of Sin*, &c. characterised by St Paul, in his second Epistle to the Thessalonians, chap. ii. And the entire description literally applies to the excesses of papal power. Had the right of private judgement, says an excellent writer, been always adopted and maintained, Antichrist could never have been; and when the sacred right comes to be universally asserted, and men follow the voice of their own reason and consciences, Antichrist can be no more. This period seems now, indeed, to be rapidly approaching: And the speedy and universal establishment of such principles, which can alone free mankind from the fetters of Antichrist, is surely "a consummation most devoutly to be wished."

(1.) * ANTICHRISTIAN. *adj.* [from *anti*, against, and *christian*.] Opposite to Christianity.—That despised, abject, oppressed sort of men, the ministers, whom the world would make *antichristian*, and so deprive them of heaven. *South*.

(2.) ANTICHRISTIANS properly denote the followers or worshippers of Antichrist. The word is more particularly understood of those who set up or believe in a false Christ or Messiah.

(1.) * ANTICHRISTIANISM. *n. s.* [from *antichristian*.] Opposition or contrariety to Christianity.—Have we not seen many, whose opinions have fastened upon one another the brand of *antichristianism*? *Decay of Piety*.

(2.) ANTICHRISTIANISM, a state or quality in persons or principles, which denominates them antichristian, or opposite to the kingdom of Christ. M. Jurieu takes the idea of the unity of the church to have been the source of *Antichristianism*.

Had not mankind been infatuated with they would never have stood in such awe of

the anathemas of Rome. It is on this the pope erected their monarchical power.

* ANTICHRISTIANITY. *n. s.* [from *antichristian*.] Contrariety to Christianity.

* ANTICHRONISM. *n. s.* [from *anti*, against, and *chronos*, time.] Deviation from the right order or account of time.

(1.) ANTICHTHON, [from *anti*, and *χθον*, earth] in ancient astronomy, a globe of earth resembling our's, and supposed to be moving round the sun but invisible to us, because on the opposite side that luminary being always exactly interposed between this other earth and our's. This idea was asserted by Pythagorus and his disciples, as is testified by Aristotle, Plutarch, &c. They reasoned from the supposed perfection of the number ten, and concluded there must be just so many spheres, and as our senses only discover nine, viz. the seven planets, the sphere of the fixed stars, and our earth, they imagined a tenth opposite to our's. Some of the fathers, who endeavoured to accommodate the doctrine of the heathen philosophers to those of christianity, assert that this Pythagorean earth was no other than the heavens of the righteous.

(2.) ANTICHTHONES, or ENTIGENÆ, in geography, are those who inhabit countries diametrically opposite to each other. In which sense, antichthones amount to much the same with what we more usually call *antipodes*. The word is also used in ancient writers, to denote the inhabitants of contrary hemispheres. See ANTIPODES and ANTOECI.

* To ANTICIPATE. *v. a.* [*anticipo*, Lat.] 1. To take something sooner than another, to prevent him that comes after; to take first possession.—God hath taken care to *anticipate* and prevent every man, to draw him early into the church; to give piety the prepossession, and engage him in holiness. *Hammond*.—If our Apostles had maintained such an *anticipating* principle engraven upon our souls before all exercise of reason; what did he talk of seeking the Lord, seeing that the knowledge of him was innate and perpetual? *Bentley*. 2. To take up before the time, which any thing might be regularly had.—I find we have *anticipated* already, and taken up from before the face, before I come to him; but I am of the temper of kings, who are for present-money, no matter how they pay it. *Dryden*. 3. To foretake, or take an impression of something, which is not yet as if it really was.—The life of the desperate equals the anxiety of death, who but act the life of the damned, and *anticipate* the desolations of last day. *Brown's Vulgar Errors*—

Why should we

Anticipate our sorrows? 'tis like those
That die for fear of death. *Dante*

4. To prevent any thing by crowding in before it to preclude.—

Time, thou *anticipat'st* my dread exploits:
The flighty purpose never is o'ertook,
Unless the deed go with it. *Shakspeare*
I am far from pretending to instruct the profane, or *anticipating* their directions to such as are under their government. *Arbutnot*.

(1.) * ANTICIPATION. *n. s.* [from *anticipate*.] 1. The act of taking up something before its time.

of two kinds; the black, which had a purgative quality; and the white, which was an emetic. Sick persons resorted to Anticyra to take the medicine, which was prepared there by a peculiar and very excellent recipe: Hence the adage, *Naviget Anticyram*. By the port in the second century was a temple of Neptune, not large, built with selected stones, and the inside white-washed; the statue of brass. The agora or market-place was adorned with images of the same metal; and above it was a well with a spring, sheltered from the sun by a roof supported by columns. A little higher was a monument formed with such stones as occurred, and designed, it was said, for the son of Iphitus. One of these, Schedius, was killed by Hector, while fighting for the body of Patroclus, but his bones were transported to Anticyra; where his brother died after his return from Troy. About two stadia or a quarter of a mile distant was a high rock, a portion of the mountain, on which a temple of Diana stood, the image bigger than a large woman, and made by Praxiteles. The walls and other edifices at Anticyra were probably erected, like the temple of Neptune, with stones or pebbles. The site is now called *Asprospitia*, or *The White Houses*; and some traces of the buildings from which it was so named remain. The port is land-locked, and frequented by vessels for corn. Some paces up from the sea is a fountain.

ANTIDACTYLUS, [from *αντι*, and *δακτυλος*, dactyle,] a name given by some to the anapæst, which is the reverse of a dactyl, and consists of two short syllables and one long: e. g. *pietās*.

ANTIDÆMONICI, [from *αντι*, and *δαίμων*, *dæmon*,] in ecclesiastical history, a sect who denied the existence of devils, or evil spirits; also all spectres, incantations, witchcrafts, &c.

ANTIDESMA, in botany, a genus of the dicæcia order, belonging to the pentandria class of plants. The calyx of the male is five-leav'd; there is no corolla; the antheræ are bifid: The female calyx is five-leav'd; the corolla is wanting; the stigmata are five; the berry is cylindric and one-seeded. There is but one species; viz.

ANTIDESMA ALEXITERIA, a native of India.

ANTIDICOMARIANITES, [from *αντιδικος*, adversary, and *Μαρια*, Mary,] an ancient sect, esteemed heretics, who said that the virgin Mary did not preserve a perpetual virginity, but that she had several children by Joseph after our Saviour's birth. Their opinion was grounded on some expressions of our Saviour, wherein he mentions his brothers and his sisters; and of St Matthew, where he says, that Joseph knew not Mary till she had brought forth her first born son. And indeed there seems to be nothing inconsistent with either Scripture or reason in the opinion. The opposite notion requires a degree of faith in Joseph's *abstinence*, by no means either *easy*, or requisite to be granted. As we hear of no prohibition after our Saviour's birth, we need not doubt but Joseph used the *jus mariti*, to which his marriage entitled him. But it was necessary for those priests who made a *goddeſs* of Mary, and who made a pretended *virtue* of breaking the first command of God and nature, "aſe and multiply," to represent their female

idol as a perpetual immaculate virgin. The Antidicomarianites were the disciples of Helvidius and Jovinian, who appeared in Rome towards the close of the 4th century.

ANTIDORON, in ecclesiastical writers, a name given by the Greeks to the consecrated bread, of which the middle part, marked with the cross wherein the consecration resides, being taken away by the priest, the remainder is distributed among the poor. On the sides of the antidoron are impressed the words *Jeſus Chriſtus vicit*. The word is formed from *δορον*, *donum*, a gift, as being given away *loco muneris*, or in charity. The antidoron is also called *panis præſanctificatus*. Some suppose the antidoron to be distributed in lieu of the sacrament, to such as were prevented from attending in person at the celebration; and thence derive the origin of the word, the eucharist being denominated *doron*, gift, by way of eminence.

ANTIDOSIS, [from *αντι*, and *δοσις*, to give,] in antiquity, denotes an exchange of estate practised by the Greeks on certain occasions, and peculiar ceremonies, and first instituted by Solon. When a person was nominated to an office, the expence of which he was not able to support, he had recourse to the antidosis; that is, he was to seek some other citizen of better substance than himself, who was free from this, and other offences; in which case, the former was excused. In case the person thus substituted, denied himself to be the richest, they were to exchange estate after this manner: the doors of their houses were close shut up and sealed, that nothing might be conveyed away; then both took an oath to make a faithful discovery of all their effects, except what lay in the silver mines, which by the law was excused from all imposts; accordingly, within three days, a full discovery and exchange of estates were made.

* **ANTIDOTAL**. *adj.* [from *antidote*.] That which has the quality of an antidote, or the power of counteracting poison.—That bezoar is *antidotal* we shall not deny. *Brown*.—Animals that can innocuously digest these poisons become *antidotal*, to the poison digested. *Brown's Vulgar Errors*.

ANTIDOTARY is used by some writers for dispensatory. We have antidotaries of several authors, as those of Meuse, Rhafis, &c.

(1.) * **ANTIDOTE**. *n. f.* [from *αντιδοτον*, *antidotus*, Lat.] a thing given in opposition to something else.—A medicine given to expel the mischiefs of another, as of poison. *Quincy*.

Trust not the physician,

His *antidotes* are poison, and he slays

More than you rob.

Shakespeare

What fool would believe that *antidote* delivered by Pierius against the sting of a scorpion? to sit upon an ass; with one's face towards the tail. *Brown's Vulgar Errors*.—

Poison will work against the stars: beware,
For ev'ry meal an *antidote* prepare. *Dryden*.

(2.) **ANTIDOTE**, used to signify a medicine taken to prevent the ill effects of poison. The Indian physic consists much in the use of antidotes. The root, mungo, and the viper-stone, are held for foreign antidotes against the bite of the *cobras* and *pello*, and other venomous creatures.

* **ANTE**

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school as a perpetual associate eye.

Indocommends were the shape of

and Jovian, who appear in the shape of the old country.

ANTIKORON, a rock given by the Greeks to the

of which the middle part, whereon the consecration is

by the priests, the name made to the post. On the

are suspended the words Je- word is named from Je-

gives away two answers, a dant is also called *jeun*

suppose the antedote to the sacrament, to such as

leading in person as the r derive the origin of the m

disseminated down, pit.

ANTIDOTES, from a

an antipathy, denotes a

antipathy, is justified by the Greeks a

peculiar economy, and

When a person was sus- expense of which he was

after the manner, they a seek some other citizen

handed, who was free from in which case, the i

case the person then is to be the richest, they a

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ANTIDOTAL, a

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ANTIDYSENTERICK. *adj.* (from *anti*, a-

against, and *dysenteria*, a bloody stool.) Good against

ANTHELMINTHICS.

SYSTEMICS.

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scribed as antiepilep-

(which we found in a

this title) is one of the

ut of a human soul

ky of spirit of wine,

dissolved!" We may

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severely, that the q-

ould have as much vi-

num head as with it.

as animal substance

stary, he might have

little alkali would no-

STREPTICUS, f. 2.

from *anti*, against, and

the evolution.

Flayer.

rance, in the depart-

hitory, the daughter

who led her father,

She was slain by the

serpent, being in love

her tomb. Her death

Thetis.

TRONIA, in ancient

myth, so called from

and afterwards Ni-

the Moetes Ceram-

m i. 3. in Arcadia, so

legimus: a. in Mac-

edonius. 5. in Chal-

c R. side of the Sinus

ult by Antigonus, not

ontes; but soon after

removed the inhabi-

ty by him and 7. one

in Pliny's time.

of Asia, one of Alex-

and his dominions

of Eumenes, and es-

who flying to Pto-

lemy commenced his

Antigonus, wherein, by

Antigonus prevailed

C. 309. Afterwards

Antigonus uniting a-

his ally Pyrrhus, and

C. 301.

Antigonus, the son of Ari-

stides, with the king

Jerusalem. He cut

to incapacitate him

put Joseph, Herod's

ly, Herod took him

and sent him to Mark Antony; who, to gratify
Herod, cut off his head, and thereby extinguished
the Almonian race, who had reigned 165 years.
This happened, A. A. C. 36.

(1.) ANTIGONUS, the I. surnamed GONATAS, king
of Macedonia, and grandson of Antigonus, (No. 1.)
succeeded his father Demetrius Poliorcetes, A. A.
C. 186, but was soon after expelled by Pyrrhus,
king of Epirus. He afterwards, by the assistance
of Antius, recovered his dominions, A. A. C. 215;
and soon after joined the Achaean league. He died
A. A. C. 243, and was succeeded by his son De-
metrius II.

(2.) ANTIGONUS, the II. surnamed DONS, king
of Macedonia, the son of Antigonus I. succeeded
his brother, Demetrius II. A. A. C. 243, and was
soon after chosen commander in chief of the Acha-
ean forces by sea and land. The league being greatly
strengthened by the accession of the Epirotes, Boe-
tians, Phocians, Arcadians, and Thesians, Cleome-
nes III. king of Sparta, raised a great army to
oppose Antigonus, but being defeated by his ally,
the Achaean, he was obliged to retreat to defend
his own kingdom, after destroying Megalopolis.
Antigonus, after taking a number of cities, com-
pletely defeated Cleomenes at Selesia, who fled
to Egypt after the battle, leaving Lacedaemon o-
pen to the victorious army, A. A. C. 261. Anti-
gonus, however, used his victory with great mo-
deration, giving the Spartans a free republican go-
vernment, and restoring their ancient laws, which
their late sovereigns had greatly altered. After this
barbarians having attacked Macedonia, Anti-
gonus returned and put them to flight, but did not
long enjoy his good fortune. For death put a stop
to his victorious career the year following; when
he was succeeded by his nephew Philip, V. who
contended so long with the Romans, A. A. C. 260.

ANTIGRAPHY (from *anti*, and *grapho*, I write,) in
antiquity, denotes a law-suit about kindred,
whereby a person claimed relation to such or such
a family.

ANTIGRAPHIA, or ANTIGRAPHIA, the of-
fice of an *ANTIGRAPHUS*. See No. 3.

(1.) ANTIGRAPHUS, in antiquity, an officer
of Athens, who kept a counterpane of the ap-
pended or chief treasurer's accounts, to prevent mil-
takes, and keep them from being falsified.

(2.) ANTIGRAPHUS, in ecclesiastical writers, an
abbreviator of the papal letters; in which sense
the word is used by pope Gregory the Great in
his register. Of late the office consists in making
minutes of bulls from the petitions agreed to by
his holiness, and renewing the bulls after engra-
ving.

(3.) ANTIGRAPHUS, or ANTIGRAPHUS, in
writers of the middle age, a secretary or chancel-
lor, so called, on account of his writing answers
to the letters sent to his master.

(4.) ANTIGRAPHUS, is also used by historians
for one of the notes of sentence, which is marked
with a dot, to denote diversity of sense in trans-
lations.

ANTIQUA, or ANTIQVA, one of the Antilles or
Caribbee Islands, situated 60 miles E. of St. Chri-
stopher's, and 40 N. of Guadalupe. It is about
20 miles long and 20 many broad, and is cir-
cumferenced; and is reckoned the largest of all the
British.

is blended with richer ores of silver, and renders the extraction of that metal difficult by volatilizing a part of the silver, or, in the language of the miners, *robbing the ore*. For the different operations respecting this semi-metal. See METALLURGY.

[illegible][illegible]

to be considered as instances of their violation of the divine law; and consequently they have no occasion either to confess their sins, or to break them off by repentance. According to them, it is one of the essential and distinctive characters of the elect, that they cannot do any thing which is either displeasing to God or prohibited by the law.—Luther, Rutherford, Schluffelburg, Sedgwick, Gataker, Witfius, Bull, Williams, &c. have written refutations; Crisp, Richardson, Saltmarsh, &c. defences, of the Antinomians, and Wigan-dus, a comparison between ancient and modern Antinomians. The doctrine of Agricola was in itself obscure, and perhaps represented worse than it really was by Luther, who wrote with acrimony against him, and first styled him and his followers *Antinomians*. Agricola stood on his own defence, and complained that opinions were imputed to him which he did not hold. Nicholas Amstdorf fell under the same odious name and imputation, and seems to have been treated more unfairly than even Agricola himself. It is not fair to charge upon a man all the opinions that may be inferred from sentiments, that have hastily dropped from him, when he himself disavows such inferences.

* **ANTINOMY**, *n. f.* [from *anti*, and *nomos*.] A contradiction between two laws, or two articles of the same law.—*Antinomies* are almost unavoidable in such variety of opinions and answers, *Baker*.

(1.) **ANTINOUS**, the catamite of the emperor Adrian, born at Bithynus in Bithynia. His beauty engaged the heart of Adrian, in such a manner, that there never was a more boundless and extravagant passion than he entertained for this youth. After his death, Adrian ordered divine honours to be paid to him! and named a city after him. See **ENPINE**. Thus, this beastly emperor, not only “gloried in his shame,” as the apostle expresses it; but immortalized it, and deified the despicable object of it! It evidences a dreadful degradation of the human intellect, that any people could be found mean enough, to comply with the imperial mandate, and to worship so contemptible a wretch!

(2.) **ANTINOUS**, in astronomy, a part of the constellation, **AQUILA**.

ANTIO, a promontory, in the pope's territories, in the middle division of Italy, so named from the ancient city of Antium. It has a fortified tower, and a harbour was lately built near it.

ANTIOCA, a small island, near Sardinia.

(1.) **ANTIOCH**, a city of Syria, in Asia, built on the river Orontes, by Seleucus Nicator, founder of the Syro-Macedonian empire, who made it his capital. It stood about 15 or 20 miles from the place where the Orontes empties itself into the Mediterranean; being equally distant from Constantinople and Alexandria in Egypt, that is, about 700 miles from each.

(2.) **ANTIOCH**, ANCIENT ACCOUNTS OF. Seleucus named this city Antioch, after his father, according to some; or his son, according to others. He built 16 other cities, bearing the same name; of which, one, situated in Pisidia, is probably that where the name of *Christians* was first given to the followers of Jesus Christ. But that

situated on the Orontes, by far eclipsed, not only all the others of this name, but all the cities built by Seleucus. Antigonus, not long before, had founded a city in that neighbourhood, which from his own name he had called *Antigonia*, and designed it for the capital of his empire; but was raised to the ground by Seleucus, who employed the materials in building his metropolis, and also transplanted the inhabitants thither. Antioch was afterwards known by the name of Tetrapolis, being divided, as it were, into four cities, each of them surrounded by its proper wall, besides a common one, which inclosed them all. The first was the city built by Seleucus Nicator; the second by those who flocked thither on its being made the capital of the Syro-Macedonian empire; the third by Seleucus Callinicus, and the fourth by Antiochus Epiphanes. About 4 or 5 miles distant, stood a place called Daphne, which was nevertheless reckoned a suburb of Antioch. Here Seleucus planted a grove, and in the middle of it built a temple which he consecrated to Apollo and Diana, making the whole an al-lum. To this place the inhabitants of Antioch resorted for their pleasures and diversions; whence by it became at last so infamous, that “to live after the manner of Daphne,” was used as a proverb to express the most voluptuous and dissolute way of living. Here Lucius Verus, the colleague of M. Aurelius, chose to take up his residence instead of marching against the Parthians; which his general Cassius forbade by proclamation, and of his soldiers to enter or even go near the place. In short, so remarkable was Daphne of old, that the metropolis itself was distinguished by it, and called Antioch near Daphne.

(3.) **ANTIOCH**, ANCIENT HISTORY OF. Though Antioch continued to be, as Pliny calls it, the queen of the East, for near 1600 years; yet scarce any city, mentioned in history, hath undergone such calamities, both from the attacks of its enemies, and its being naturally subject to earthquakes. The first disaster mentioned in history which befel the Antiochians, happened about A. A. C. 145. Being at that time very much affected to the person and government of Demetrius their king, they were continually raising tumults, insomuch that he found himself at last obliged to solicit assistance from the Jews; and was furnished by Jonathan, one of the Maccabees with 3000 men; by which reinforcement, believing himself sufficiently strong to reduce the metropolis by force, he ordered them immediately deliver up their arms. This unexpected order caused a great uproar in the city. The inhabitants ran to arms, and invested the king's palace to the number of 120,000, with a design to kill him to death. All the Jews hastened to his relief, fell upon the rebels, killed 100,000 of them, and set fire to the city. On the destruction of the Syrian empire by the Romans, Antioch submitted to them, as well as the other cities of that kingdom, and continued for a long time under their dominion. About the year 115, in the reign of Trajan, it was almost entirely ruined by one of the most dreadful earthquakes mentioned in history. Trajan himself happened to be there at that time, being returned from an expedition gain

five. He did not spare even the children, who had insulted the emperor's statues; and caused several persons to be executed, who had been only spectators of the disorder. In the mean time, a report was spread, that a body of troops was at hand, with orders to plunder the city, and put all to the sword, without distinction of sex or age; upon which the citizens abandoned their dwellings in the utmost terror and confusion, retiring to the neighbouring mountains with their wives and families. As the report proved groundless, some of them returned; but the greater part, dreading the cruelty of the governor, and the displeasure of the emperor, continued in their retreats. To those who returned, St Chrysostom preached some homilies, which have reached our times, and are greatly admired; and which are said by St Chrysostom himself, as well as some cotemporary writers, to have had a considerable effect in reforming the lives of this licentious and dissolute people. On hearing the news of this tumult, Theodosius was so much enraged, that he commanded the city to be destroyed, and its inhabitants to be put to the sword without distinction; but this order was revoked before it could be put into execution, and he contented himself with a punishment similar to that inflicted by Severus above-mentioned. (§ 3.) He appointed judges to punish the offenders; who proceeded with such severity, and condemned such numbers, that the city was thrown into the utmost consternation. On this occasion, St Chrysostom and the hermits, who were very numerous in the neighbourhood, exerted all their eloquence in behalf of the unhappy people, and obtained a respite for those who had been condemned. They next proceeded to draw up a memorial to the emperor in favour of the citizens in general; and being joined by Flavianus, at last obtained a general pardon, and had the city restored to all its former privileges. In 458, Antioch was almost entirely ruined by an earthquake, which happened on the 14th of September; scarce a single house being left standing in the most beautiful quarter of the city. A similar misfortune happened in 525, during the reign of the emperor Justin; and 15 years after, being taken by Cosroes king of Persia, that haughty tyrant gave it up to his soldiers, who put all they met to the sword: The king himself seized on all the gold and silver vessels belonging to the great church; and caused all the valuable statues, pictures, &c. to be taken down and conveyed to Persia, while his soldiers carried off every thing else. The city being thus completely plundered, Cosroes ordered his men to set fire to it; which was accordingly done so effectually, that none of the buildings even without the walls escaped. Such of the inhabitants as escaped slaughter were carried into Persia, and sold as slaves. Notwithstanding such great and repeated calamities, the city of Antioch soon recovered its wonted splendor; but in a short time underwent its usual fate, being almost entirely reduced by an earthquake in 587, by which 30,000 persons lost their lives. In 634, it fell into the hands of the Saracens, who kept possession of it till the year 858, when it was surprised by ^{ʿAzas}, and again annexed to the Roman Empire. The Romans continued masters of it for

some time, till the civil dissensions in the empire gave the Turks an opportunity of seizing upon it, as well as the whole kingdom of Syria. From them it was again taken by the Crusaders in 1099. In 1262, it was taken by Bibarus sultan of Egypt, who put a final period to its glory.

(I.) ANTIOCH, PRESENT STATE OF. Antioch, which is now called ANTHAKIAH, is no more than a ruinous town, whose houses, built with mud and straw, and narrow and miry streets, exhibit every appearance of misery and wretchedness. These houses are situated on the southern bank of the Orontes, at the extremity of an ancient decayed bridge: they are covered to the south by a mountain; upon the slope of which is a wall built by the crusaders. The distance between the present town and this mountain is about 400 yards, which space is occupied by gardens and heaps of rubbish but presents nothing interesting. Notwithstanding the unpolished manners of its inhabitants, Antioch was better calculated than Aleppo to be the emporium of the Europeans. In clearing the mouth of the Orontes, which is 10 leagues lower down, boats might have been towed up that river, though they could not have floated up, as Pococke has asserted; its current is too rapid. The natives who never knew the name of the Orontes, call it, on account of the swiftness of its stream, *El-aasi*, or the *Affi*, that is, the rebel. Its breadth, at Antioch, is about 40 paces. Some leagues above that town, it passes by a lake bounding in fish, and especially in eels. A great quantity of these are salted every year, but not sufficient for the numerous fasts of the Greek Christians. We no longer hear at Antioch, either of the Grove, or Daphne, or of the voluptuous scenes of which it was the theatre. The plain of Antioch, though the soil of it is excellent, is uncultivated and abandoned to the Turkomans; but the hills on this side of the Orontes, opposite Selekia, abound in plantations of figs and olives, vine and mulberry trees, which, (a thing uncommon in Turkey,) are planted in quincunx, and exhibit a landscape worthy our finest provinces. Seleucus Nicator, when he founded Antioch, built at the mouth of the Orontes, on the northern bank, a large and well fortified city, which bore his name, but of which at present not a single habitation remains: nothing is to be seen but heaps of rubbish, and works in the adjacent rock, which prove that this was once a place of considerable importance. In the sea also may be perceived the traces of two piers, which are indications of an ancient port, now choked up. The inhabitants of the country go thither to fish, and call the name of the place *Souaidia*. Antioch is situated 15 miles S. of Scanderoon, 40 S. W. of Aleppo, and 15 E. of the Mediterranean. Long. 36. 45. E. Lat. 35. 17. N.

(II.) ANTIOCH, the capital of Pisidia, where Paul and Barnabas, permitted by the ruler of the Jewish synagogue, preached the gospel, till the Jews raised a persecution against them. See Acts xxiii. 14—50.

ANTIOCHEA. See ANTIOCHIA.

ANTIOCHETTA, a town of Turkey, in Asia Minor, in Carmania, with a bishop's see, over against the island of Cyprus. Long. 32. 15. E. Lat. 36. 42. N.

ANTIO

than a sparry concretion, formed by the water dropping from the roof of the cave, and by degrees hardening into a figure that their fears had formed into a monster. Incited by this extraordinary appearance, we were induced to proceed still further, in quest of new adventures in this subterranean abode. As we proceeded, new wonders offered themselves: the spars, formed into trees and shrubs, presented a kind of petrified grove; some white, some green; and all receding in due perspective. They struck us with the more amazement, as we knew them to be mere productions of Nature, who, hitherto in solitude, had, in her playful moments, dressed the scene, as if for her own amusement. But we had as yet seen but a few of the wonders of the place; and we were introduced as yet only into the portico of this amazing temple. In one corner of this half-illuminated recess, there appeared an opening of about three feet wide, which seemed to lead to a place totally dark, and that one of the natives assured us contained nothing more than a reservoir of water. Upon this we tried, by throwing down some stones, which rumbling along the sides of the descent for some time, the sound seemed at last quashed in a bed of water. In order, however, to be more certain, we sent in a Levantine mariner, who, by the promise of a good reward, with a flambeau in his hand, ventured into this narrow aperture. After continuing within it for about a quarter of an hour, he returned, carrying some beautiful pieces of white spar in his hand, which art could neither imitate nor equal. Upon being informed by him that the place was full of these beautiful incrustations, I ventured in once more with him, for about 50 paces, anxiously and cautiously descending by a steep and dangerous way. Finding, however, that we came to a precipice which led into a spacious amphitheatre, if I may so call it, still deeper than any other part, we returned; and being provided with a ladder, flambeaux, and other things to expedite our descent, our whole company, man by man, ventured into the same opening, and, descending one after another, we at last saw ourselves altogether in the most magnificent part of the cavern. Our candles being now all lighted up, and the whole place completely illuminated, never could the eye be presented with a more glittering or a more magnificent scene. The roof all hung with solid icicles, transparent as glass, yet solid as marble. The eye could scarce reach the lofty and noble ceiling; the sides were regularly formed with spars; and the whole presented the idea of a magnificent theatre, illuminated with an immense profusion of lights. The floor consisted of solid marble; and in several places, magnificent columns, thrones, altars, and other objects, appeared, as if nature had designed to mock the curiosities of art. Our voices, upon speaking or singing, were redoubled to an astonishing loudness; and, upon the firing of a gun, the noise and reverberations were almost deafening. In the midst of this grand amphitheatre rose a concretion of about 15 feet high, that, in some measure, resembled an altar; from which, taking the hint, we caused mas to be celebrated there. The beautiful columns that shot up round the altar, appeared like candlesticks; and many o-

ther natural objects represented the customary ornaments of this sacrament. Below even this spacious grotto, there seemed another cavern; down which I ventured with my former mariner, and descended about 50 paces by means of a rope. I at last arrived at a small spot of level ground, where the bottom appeared different from that of the amphitheatre, being composed of soft clay, yielding to the pressure, and in which I thrust a stick to about six feet deep. In this, however, as above, numbers of the most beautiful crystals were formed; one of which, particularly, resembled a table. Upon our egress from this amazing cavern, we perceived a Greek inscription upon a rock at the mouth; but obliterated by time that we could not read it. It seemed to import that one Antipater, in the time of Alexander, had come thither; but whether he penetrated into the depths of the cavern, he does not think fit to inform us." From this account Mr Tournefort differs considerably. Mr Magni mentions only one descent or precipice from the entry of the cave to the grotto, or most magnificent part: Mr Tournefort says that there were many very dangerous precipices and rugged ways, through which they were obliged to pass sometimes on their back and sometimes on their belly; but gives no particular account of his journey till he comes to the grand cavern. This indeed he describes very pompously; but as by it he evidently wants to support a favourite hypothesis, namely, the vegetation of stones, perhaps the particulars are not altogether to be depended upon. He informs us, that, at the entry into the cavern, he met with a Greek inscription almost defaced, containing a good number of proper names; and that there was a tradition among the inhabitants, that these were the names of some who had conspired against Alexander the Great, and having missed their aim, had taken refuge in this grotto.

(3.) ANTIPAROS, CAVERN OF, FARTHER DESCRIBED. The most particular account, however, of this famous grotto that hath hitherto been published, appeared in the British magazine, in a letter signed Charles Saunders, and dated Feb. 24th 1746-7; which, as it is very particular, and seems to bear sufficient marks of authenticity, we have here insert. "Its entrance lies in the side of a rock, about two miles from the sea shore; and a spacious and very large arch, formed of rough craggy rocks, overhung with brambles and a great many climbing plants, that give it a gloominess which is very awful and agreeable. Our surgeon myself, and four passengers, attended by six guides with lighted torches, entered this cavern about 6 o'clock in the morning, in the middle of August last. We had not gone 20 yards in this cavity when we lost all sight of day-light; but our guide going before us with lights, we entered into a narrow kind of alley, surrounded every way with stones all glittering like diamonds by the light of our torches; the whole being covered and lined throughout with small crystals, which gave a thousand various colours by their different reflections. This alley grows lower and narrower as one goes on, till at length one can scarce get along it. At the end of this passage we were each of us provided with a rope to tie about our middles; which

stone; and the rocks in our way were in some places so steep, that we were forced to lie all along on our backs, and slide down; and so rough, that they cut our clothes, and bruised us miserably in passing. Over our heads, there were nothing but ragged black rocks, some of them looking as if they were every moment ready to fall in upon us; and, on our left hand, the light of our guides' torches showed us continually the surfaces of dirty and miserable looking lakes of water. If I had heartily repented of my expedition often before, here I assure you I was all in a cold sweat, and fairly gave myself over for lost; heartily cursing all the travellers that had written of this place, that they had described it so as to tempt people to see it, and never told us of the horrors that lay in the way. In the midst of all these reflections, and in the very dismal part of all the cavern, on a sudden we had lost four of our six guides. What was my terror on this sight! The place was a thousand times darker and more terrible for want of their torches; and I expected no other but every moment to follow them into some of these lakes, into which I doubted not but they were fallen. The remaining two guides said all they could, indeed; to cheer us up; and told us we should see the other four again soon, and that we were near the end of our journey. I don't know what effect this might have upon the rest of my companions; but I assure you I believed no part of the speech but the last, which I expected every moment to find fulfilled in some pond or precipice. Our passage was by this time become very narrow, and we were obliged to crawl on all fours over rugged rocks; when in an instant, and in the midst of these melancholy apprehensions, I heard a little hissing noise, and saw myself in utter, and not to be described darkness. Our guides called indeed cheerfully to us, and told us that they had accidentally dropped their torches into a puddle of water, but we should soon come to the rest of them, and they would light them again; and told us there was no danger, and we had nothing to do but to crawl forward. I cannot say but I was amazed at the courage of these people; who were in a place where, I thought, four of them had already perished, and from whence we could none of us ever escape; and determined to lie down and die where I was. Words cannot describe the horror, or the extreme darkness, of the place. One of our guides, however, perceiving that I did not advance, came up to me, and clapping his hand firmly over my eyes, dragged me a few paces forward. While I was in this strange condition, expecting every moment death in a thousand shapes, and trembling to think what the guide meant by this rough proceeding, he lifted me at once over a great stone, set me down on my feet, and took his hand from before my eyes. What words can describe at that instant my astonishment and transport! Instead of darkness and despair, all was splendor and magnificence before me; our guides all appeared about us; the place was illuminated by 50 torches, and the guides all welcomed me into the grotto of Antiparos. The four that were first missing, I now found had only given us the sign, to get the torches lighted before we came;

and the two had put out their lights on purpose to make us enter out of utter darkness into this pavilion of splendor and glory. I am now come to the proper business of this letter; which was, to describe this grotto. But I must confess to you that words cannot do it. The amazing beauties of the place, the eye that sees them only can conceive. The best account I can give you, however, pray accept of." See § 4:

(4.) ANTIPAROS, THE GROTTTO OF, DESCRIBED. "The people told us, the depth of this place was 485 yards. The grotto, in which we now were is a cavern of 120 yards wide, and 113 long, and seems about 60 yards high in most places. Their measures differ something from the accounts travellers in general give us; but you may depend upon them as exact, for I took them with my own hand. Imagine, then, an immense arch like this, almost all over lined with fine and bright chrystallized white marble, and illuminated with 50 torches; and you will then have some faint idea of the place. I had the pleasure to spend three hours in. This, however, is but a faint description of its beauties. The roof, which is a fine vaulted arch, is hung all over with icicles of white shining marble, some of them ten feet long, and as thick as one's middle at the root: and among these there hang 1000 festoons of leaves and flowers of the same substance; but so very glittering that there is no bearing to look up at them. The sides of the arch are planted with seeming trees of the same white marble, rising in rows one above another, and often inclosing the points of the icicles. From these trees there are also hung festoons, tied as it were from one to another in vast quantities; and in some places among them there seem rivers of marble winding through them in a thousand meanders. All these things are only made, in a long course of years, from the dropping of water, but really look like trees and brooks turned to marble. The floor we trod upon was rough and uneven, with crystals of all colours growing irregularly out of it, red, blue, green, and some of a pale yellow. These were all shaped like pieces of saltpetre; but so hard that they cut our shoes: among these, here and there, are placed icicles of the same white shining marble with those above, and seeming to have fallen down from the roof and fixed there; only the big end of these is to the floor. To all these our guides had tied torches, two or three to a pillar, and kept continually beating them to make them burn bright. You must guess what glare of splendor and beauty must be the effect of this illumination, among such rocks and columns of marble. All round the lower part of the sides of the arch are a thousand white masses of marble, in the shape of oak trees. Mr Tournefort compares them to cauliflowers, but I should as soon compare them to toad-stools. In short they are large enough to inclose, in many places a piece of ground big enough for a bed-chamber. One of these chambers has a fair white curtain whiter than satin, of the same marble, stretched all over the front of it. In this we all cut our names, and the date of the year, as a great many people have done before us. In a course of years afterwards, the stone blisters out like this

to make them faint at the sight of these animals. Of these and a thousand other antipathies the ancient naturalists, the schoolmen, and the vulgar, form so many legends; and relate them as certain facts, that they may demand an explication of them from the philosophers. But we should first inquire whether such antipathies actually exist or not.

(4.) ANTIPATHY, INQUIRY INTO THE REALITY OF. To explore the matter without prejudice, we find it necessary to abstract from the subjects of this disquisition, 1. All such antipathies as are not ascertained; as that which is supposed to be felt by hens at the sound of an harp whose strings are made of a fox's bowels; between the salamander and tortoise, and between the weasel and the toad. Nothing is less confirmed, or rather nothing is more false, than these stories with which vulgar credulity and astonishment are amused and actuated: and though some of these antipathies should be ascertained, this would be no proof that the animals which feel them are not acquainted with their causes, according to their mode and proportion of knowledge; in which case it will be no longer the antipathy which we have defined. 2. We must abstract those antipathies which can be extinguished or resumed at pleasure; those fictitious aversions, which certain persons feel, or pretend to feel, with affected airs, that they may appear more precise and finical, or singularly and prodigiously elegant; that they may seem to have sensibilities so exquisitely fine, as require to be treated with peculiar delicacy. One who bestows any attention on the subject, would be astonished to find how many of these chimerical aversions there are, which are pretended, and passed upon the world by those who affect them as natural and invincible. 3. When we abstract those aversions the causes of which are known and evident; we shall be surprised, after our deduction of these pretended antipathies from the general sum, how small, how inconsiderable, is the quantity of those which are conformable to our definition. Will any one call by the name of *antipathy*, those real, innate, and incontestable aversions which prevail between sheep and wolves? Their cause is obvious: the wolf devours the sheep, and subsists upon his victims; and every animal naturally flies with terror from pain and destruction: sheep therefore regard wolves with horror. Besides, this aversion is improperly stiled *reciprocal*; for it only takes place on the part of the sheep. The wolf, instead of *antipathy* or *aversion*, feels an irresistible desire, (or *fondness*, so to speak,) for mutton.

(5.) ANTIPATHY, PRINCIPAL CAUSES OF. From principles similar to those of the aversion entertained by sheep against wolves, arises that aversion which numbers of people feel against serpents; against reptiles in general, and the greatest number of insects. During the credulous and susceptible period of infancy, pains have been taken to impress on our minds the frightful idea that they are venomous; that their bite is mortal; that their sting is dangerous, productive of tormenting inflammations, and sometimes of death: they have been represented to us as ugly, and pernicious to those who touch them: as poisoning those who have the misfortune to swallow them; or as living

and multiplying within them. These horrible prepossessions are industriously inculcated from infancy; they are sometimes attended and supported by dismal tales, which are greedily imbibed, and indelibly engraven on our memories. It has been taught us both by precept and example, when others at their approach have assumed in our view the appearance of detestation and even of terror, that we should fly from them. Is it then wonderful, (if our false impressions as to this subject have been corrected neither by future reflections nor experiments,) that we should entertain, during our whole lives, an aversion for these objects, even when we have forgot the admonitions, the conversations, and examples, which have taught us to believe and apprehend them as noxious beings? In proportion to the sensibility of our frame, in proportion as our nerves are irritable, our emotions at the sight of what we fear will be more violent, especially if they anticipate our expectation, and seize us unprepared, though our ideas of what we have to fear from them are the most confused and indistinct imaginable. To explain these facts, it is by no means necessary to fly to the exploded subterfuge of occult qualities inherent in bodies, to latent relations productive of antipathies, of which no person could ever form an idea. It is often sufficient to influence a person who had formerly no aversion for an object, if he lives with some other associate who gives himself up to such capricious panics; the habit is insensibly contracted to be agitated with disagreeable emotions at the presence of an object which had been formerly beheld with indifference and cold blood. "I was acquainted (says the author of the article ANTIPATHY in the French Encyclopedie) with a person of a very sound understanding, whom thunder and lightning by no means terrified, nay, to whom the spectacle appeared magnificent and the sound majestic; yet to a mind thus seemingly fortified against the infectious terror, no more was necessary than spending the summer with a friend in whom the appearance of lightning excited the strongest emotions, and whom the remotest clap of thunder affected with extravagant paroxysms, to become timid in excess at the approach of thunder; nor could he ever afterwards surmount the fear which it inspired." The frightful stories of dogs and cats, which have killed their master, or who have given them mortal wounds, are more than sufficient to inspire a timorous person with aversion against these animals; and if the olfactory nerves of such a person be delicate, he will immediately discover the smell of them in a chamber: disturbed by the apprehension which these effluvia excite in his mind, he gives himself up to the most violent uneasiness, which is tranquillized when he is assured that the animal is no longer in the room. If by chance, in the search which is made to calm the uneasiness of this timorous person, one of these creatures should at last be discovered, every one presently exclaims, *A miracle!* and admits the reality of *antipathies* into his creed; whilst all this is nothing but the effect of a childish fear, founded on certain confused and exaggerated ideas of the hazard which one may run with these animals. The antipathy which some people entertain against eels,

though

tween two. The word sometimes denotes a species of psalmody, wherein the congregation, being divided into parts, repeat the psalms, verse for verse, alternately. In this sense, antiphony differs from symphony, where the whole congregation sings together. It also differs from responsarium wherein the verse is only spoken by one person, whereas in the former, the verses are sung by the two choirs alternately. The original of antiphonal singing, in the western churches, is referred to the time of St Ambrose, who, about the year 374, is said to have first introduced it into the church of Milan, in imitation of the eastern church, where it appears to be of greater antiquity; though, as to the time of its institution, authors are not agreed; it was most probably introduced at Antioch, between the years 347 and 356. Antiphony also denotes the words given out at the beginning of the psalm, to which both the choirs accommodate their singing. It signifies in a modern sense, composition made of several verses extracted out of different psalms, adapted to express the mystery solemnized on the occasion.

(1.) *ANTIPHRAISIS. *n. s.* [from *anti*, against, and *phraisis*, a form of speech. The use of words in a sense opposite to their proper meaning.—You now find no cause to repent, that you never dipt your hands in the bloody high courts of justice, so called only by *antiphrasis*. South.

(2.) ANTIPHRAISIS, is defined by Sanctius, to be a form of irony, whereby we say a thing, by denying what we ought rather to affirm it to be: as when we say, *it did not displease me*; or, *he is no fool*; meaning, *I was pleased with it*; or, *he is a man of sense*. On this principle, the antiphrases ought to be ranked among the figures of sentences, and not among those of words. It is a common error, to make antiphrases consist in single words; as when we say, that the *Parcæ* are thus called by antiphrases, because they spare nobody, *Parcæ, qui nemini parcunt*. St Jerom, in his epistle to Riparius against Vigilantius, says, he ought rather to be called *Dormitantius per antiphrasin*, than Vigilantius, because he opposed the Christians holding wakes at the tombs of the martyrs. Sanctius holds it improper to call these antiphrases: because phraisis is not applicable to a single word, but signifies *orationem, loquendi modum*.

ANTIPHTHISICA, [from *anti*, and *phthisis*, corruption,] medicines against consumption.

ANTIPLEURITICS, medicines against the pleurisy.

ANTIPODAGRICS, [from *anti*, and *podagra*, the gout,] remedies for the gout.

*ANTIPODAL. *adj.* [from *antipodes*.] Relating to the countries inhabited by the antipodes.—The Americans are *antipodal* unto the Indians. Brown.

(1.) *ANTIPODES. *n. s.* *It has no singular.* [from *anti*, against, and *podai*, feet.] Those people who, living on the other side of the globe, have their feet directly opposite to ours.—

We should hold day with the *antipodes*,
If you would walk in absence of the sun.

Shakespeare.

So shines the sun, tho' hence remov'd, as
clear

When his beams warm th' *antipodes*, as here.
Waller.

(2.) ANTIPODES, FARTHER DEFINITION OF. Antipodes lie under opposite meridians, and opposite parallels; in the same degree of latitude, but of opposite denominations, one being north, and the other south. They have nearly the same degree of heat and cold, days and nights of equal length, but in opposite seasons. It is noon to one, when midnight to the other; and the longest day with the one, is the shortest with the other.

(3.) ANTIPODES, OPINIONS OF THE ANCIENTS RESPECTING. Plato is esteemed the first who thought it possible that antipodes existed, and is looked upon as the inventor of the word. As this philosopher apprehended the earth to be spherical, he had only one step to make, to conclude the existence of antipodes. The ancients in general, treated this opinion with the highest contempt. Lactantius and Augustine, laughed at the notion of antipodes. The latter of these authors is strangely perplexed to think, how men and trees should hang pendulous in the air, with their feet uppermost, as he thought they must do in the other hemisphere! And Boniface, archbishop of Mentz, and legate of pope Zachary in the 8th century, declared a bishop of that time called Virgilius, a *heretic*, for maintaining that there were such beings as antipodes. But the Christian fathers were not the only persons who disputed the truth of the antipodes. Lucretius had done it before them, at the end of his first book, v. 1063, &c. See also Plutarch, lib. I. *facie in orbe lucinæ*; and Pliny, who refutes the opinion, lib. ii. cap. 5. They never reflected that these terms *upwards* and *downwards* are merely relative; and signify only nearer to, or farther from, the centre of the earth, the common centre, to which all heavy bodies gravitate; and that, therefore, our antipodes have not their feet upwards, and head downwards, any more than ourselves; for they, as well as we, have their feet nearer the centre of the earth, and their heads farther from it. To have the head downwards, and feet upwards, is to place the body in a direction of gravity, tending from the feet to the head: but this cannot be supposed with regard to the antipodes; for they, as well as we, tend toward the centre of the earth, in a direction from head to foot.

ANTIPODIA, in poetry, a figure by which one foot is changed for another, if both be of equal measure.

ANTIPODIS, in ancient geography, a colony of the Massilians, near the river Verus, in Gallia Narbonensis. It is now called ANTIBES, which see.

(1.) *ANTIPOPE. *n. s.* [from *anti*, against, and *pope*.] He that usurps the popedom, in opposition to the right pope.—This house is famous in history, for the retreat of an *antipope*, who called himself Felix V. Addison.

(2.) ANTIPOPES. Geddes gives the history of no less than 24 schisms in the Romish church caused by antipopes; some took their rise from diversity of doctrine of belief, which led different parties to elect each their several pope; but great



without the
and Rome,
very apply,
to the phy-
may have a
nd principles
ancients to
admiral and
not and poet
assess their
Rome, com-
ded into sacred
a universal
the antiquaries
in a spirit of pa-
great frequen-
and employ them-
learned trifles:
never to make us
all and useful pur-
sue their learn-
of the antiquities
field is far too con-
the whole of this
fades the antiquities
as, Phœnicians, Cap-
tains, and, in general,
mentioned in ancient
us of them are come
usual subjects above-
the study of antiquity,
and the precious relics
caryatid, medal, &c.
antiquities form a science
composed, and with
acquaintance could have
as man, if our judgements
is way for us; if they had
mable works as those of
Isidore, Cosmas, Caylus,
the antiquities of D. then
in antiquities of Brasen-
of Nieupoort, and especially
of Pausanias's *Stylis* and
Not must we here forget
it, with which our country-
od has lately enriched this
is well known, and so justly
a monument, under the title
myra, and those of *Balthus*. In
a we are fully convinced of the
ance, the taste and elegance,
of the ancients. We here for that
these nations is not all owing to
that there were other nations who
could. For, though many of the
myra are to be attributed to the
as, and to Odenius and his wife
; raised there about the year 1664
found, at the same place, ruins of
it appear to be of far greater anti-
that we are not less harmful. The au-
thors are not less to prove this assertion,
they relied on all their masters, and
we attempt to acquire any knowledge
n, we shall soon be convinced, that
is a pretence to laugh at a learned
The knowledge of these monuments
PART I.

of the ancients, the works of sculpture, painting,
graving, painting, &c. which they call *antiquities*,
requires a strict attention, with regard to the mat-
ter itself on which the art has been exercised; as
the wax, clay, wood, ivory, stones of every kind,
marble, flint, bronze, and every sort of metal.
We should begin by learning on what matter each
ancient nation principally worked, and in which
of the fine arts they excelled. For the matter it-
self, as the different sorts of marble, compositions
of metals, and the species of precious stones: first
frequently to characterize the true antique, and
to discover the counterfeit. The connoisseurs
pretend also to know, by certain distinct charac-
ters in the design and execution of a work of art,
the age and nation where it was made. They
find, moreover, in the invention and execution, a
degree of excellence, which modern artists are not
able to imitate. Now, though we ought to allow,
in general, the great merit of the ancients in the
polite arts, we should not, however, suffer our
admiration to lead us into a blind superstition.
There are pieces of antiquity of every sort, which
have come down to us, some that are perfectly
excellent; and others so wretched, that the mean-
all among modern artists would not acknowledge
them. The mixture of the good and bad has ta-
ken place in all subjects, at all times, and in all
nations. The masterpiece is, that most of our
great antiquaries have been so little skilled in de-
signing, as scarcely to know how to draw a circle
with a pair of compasses. It is prejudice, there-
fore, which frequently directs them to give the
palm to the ancients, rather than a judgment di-
rected by a knowledge of the art. That charac-
ter of expression, which they find so marvellous
in the works of antiquity, is often nothing more
than a mere chimaera. They pretend that the art-
ists of our days constantly exaggerate their expres-
sions; that a modern Bacchus has the appearance
of a man distracted with intoxication; that a Mer-
cury seems to be animated with the spirit of a
fury; and so of the rest. But let them not decide
too hastily. Almost all the antique figures are to-
tally void of all spirit of expression; we are forced
to guess at their characters. Every artificial ex-
pression requires, moreover, to be somewhat ex-
aggerated. A statue or portrait is an human
figure; and must therefore have a very different
effect from one which, being endowed with life,
has the muscles constantly in play, and where the
continued change of the features, the motion of
the eyes, and the mouth, more or less lively, easily
and clearly express the passions and sentiments.
Whereas, in a figure that is the produce of art,
the delicate touches, that should express the pas-
sions, are lost to the eyes of the spectators: they
must therefore be struck by strong, bold charac-
ters, which can affect them at the first glance of
the eye. A very moderate smile is sensible, at the
same time, that he is not to give his figure extra-
vagant expressions, not to place them in different
attitudes.

(L.) * ANTIQUITY. s. f. (antiquitas, Lat.)

1. Old times; time past long ago.—I mention A-
ristotle, Polybius, and Cicero, the greatest philo-
sopher, the most impartial historian, and the most
spectacular description of all antiquity. *Antiquities*
P. 2.

(3.) ANTISEPTICS, VIRTUES OF, IN GENERAL.

In the above table the proportions are marked in integral numbers: only to some there is added the sign +, to show, that those salts are possessed of a stronger antiseptic virtue than the number in the table expresses, by some fractions; unless in the three last, where the same sign imports, that the salt may be stronger by some units. Some resinous and other substances even exceed the antiseptic virtues of the neutral salts; thus myrrh, asafetida, terra japonica, and aloes, are at least 12 times more antiseptic than sea-salt. Two grains of camphor is equivalent to 60 grains of that salt. An infusion of a few grains of Virginian snake-root, in powder, exceeds 12 times its weight of sea-salt. Peruvian bark and camomile flowers have nearly the same extraordinary quality. Besides these, pepper, ginger, saffron, contrayerva-root, are 12 times more antiseptic than sea salt. Dried sage, rhubarb, the root of the wild valerian, mint, angelica, ground ivy, senna, green-tea, red roses, wormwood, mustard, and horse-radish, were likewise found more antiseptic than the standard. To the class of antiseptic medicines may likewise be added fermented liquors, acids, spirits, and even those plants called *anti-acids*, and erroneously supposed hasteners of putrefaction, particularly horse-radish. Vegetables, possessing this virtue, are the more valuable, that being usually free of acrimony, they may be taken in much greater quantities, than either spirits, acids, resins, or even the neutral salts. Antiseptics are prescribed in all putrid, malignant, and pestilential cases. It is to be remarked, however, that different kinds of them are to be given in different diseases, and in different stages of the same disease. Thus, the bark is a specific in a gangrene, when the vessels are relaxed, and the blood resolved or disposed to putrefaction; but will fail, if the vessels are too full, or the blood be too thick. With the same caution is the bark to be used in wounds, viz. chiefly in cases of absorbed matter, when it infects the humours, and brings on a hectic fever. By the great antiseptic virtue of alum, the bark, and other astringents, it should seem, that astringent had no small share in the cure of putrid disorders; and, indeed, the very nature of putrefaction consists in a separation or disunion of the parts. But as astringents are improper to be administered in many cases, contrayerva-root, snake-root, camphor, &c. may supply their place; which, though highly antiseptic, have very little, or any, of an astringent quality.

ANTISIGMA, among the ancient grammarians, signifies one of the notes or sentences affixed to those verses whose order was to be changed.

ANTISOPHIST, [from *anti*, and *sophist*, a sophister.] a counter sophister; one that disputes on the opposite side.

* ANTISPASIS. *n. s.* [from *anti*, against, and *spas*, to draw.] The revulsion of any humour into another part.

(1.) * ANTISPASMODICK. [from *anti*, against, and *spasmod*, the cramp.] That which has the power of relieving the cramp.

(2.) ANTISPASMODICS are more accurately defined, medicines proper for the cure of spasms and convulsions. Opium, balsam of Peru, and the essential oils of many vegetables, are the principal

in this class of medicines. Opium excels for its immediate effects. Peruvian balsam, in many instances, produces more lasting benefit than opium, and sometimes succeeds where opium fails. Antispasmodics, the essential oils differ in this from opium, that they act more on a particular part than on the system in general, and have no soporific effect. Some medicines remove spasms by immediate contact, as asses milk, cream, oil of almonds; others by repelling heat, as gas, sulphur, nitre, sal ammoniac, &c. And where the strictures are produced by inanition and a defect of vital heat, spasms are removed by those medicines that restore the *vis vite*, such as valerian, castoreum, &c.

* ANTISPASTICK. *adj.* [from *anti* and *spas*.] Medicines which cause a revulsion of the humours.

ANTISPASTUS, a poetical foot, consisting of four syllables, whereof the first is short, the second and third long, and the fourth short.

* ANTISPLENETICK. *adj.* [from *anti* and *splenetick*.] Efficacious in diseases of the spleen.—*Antispleneticks* open the obstructions of the spleen. *Ployer*.

ANTISPODIUM. See SPODIUM.

ANTISTA, a priestess. See ANTISTES.

ANTISTANCARIANS, a sect of German protestants who oppose the doctrine of Stancarius who asserted that justification was the sole effect of Christ's human nature, exclusive of his divinity.

(1.) ANTISTASIS, in antiquity, denotes the gibbous part of the liver in the Grecian victims.

(2.) ANTISTASIS, in oratory, a defence of an action from the consideration that, had it been omitted worse, would have ensued. This is called by Latin writers *comparativum argumentum*; such, *gr.* would be the general's defence who had made an inglorious capitulation, That, without it, the whole army must have perished.

ANTISTES, [from *ante*, before, and *sto*, I stand in ecclesiastical writers,] a title usually given to bishops, though sometimes also to priests or presbyters. Among the ancient Romans, antistes was an appellation given to the chief of the priests in the provinces. Females of this rank were called *Antistae*.

ANTISTHENES, a Greek philosopher, and founder of the Cynics. He was born at Athens and passed the early part of his life as a soldier. Having afterwards been an attendant at the lectures of Socrates, he was principally charmed with those exhortations of that great philosopher which persuaded to frugality, to temperance, and to moderation: these Antisthenes was resolved to practise by carrying every precept to its utmost extent. Permitting therefore his beard to grow, he went about the streets in a thread-bare coat, scarcely to be distinguished from a common beggar. He prided himself upon the most rigid virtue, and thought himself obliged to attack the vicious wherever he found them. This gave him some reputation in the city; but it may be supposed, that, in a place so very luxurious as Athens, he had more enemies than disciples. His philosophy consisted rather in action than speculation: it was therefore his constant maxim, That to be virtuous was to be happy, and that all virtue consisted

fixed in action; that the wise man should live for himself, contented in all situations, and happy alone in the consciousness of his own virtue. He acknowledged nothing to be good but what was honourable; and asserted, that virtue might be acquired by practice. Laertius tells us there were 10 volumes of his works; and he has given us many of his apophthegms.

ANTISTICHON. See ANTISTOECHON.

ANTISTITIUM, is a term used in ancient chronicles for an abbey or monastery.

ANTISTOECHON, } [from *anti*, and *stoechon*,
ANTISTOICHON, } letter,] a grammatical figure whereby one letter is used instead of another.

(1.) * ANTISTROPHE. *n. f.* [*αντιστροφη*, from *anti*, the contrary way, and *strophē*, turning.] In an ode supposed to be sung in parts, the second stanza of every three, or sometimes every second stanza; so called because the dance turns about.

(2.) ANTISTROPHE, [from *anti*, and *strophē*, to turn,] a kind of dance in use among the ancients; wherein they stepped sometimes to the right and sometimes to the left, still doubling their turns or conversions. It was customary among the Greeks, on some occasions, to dance round the altars, whilst they sung the sacred hymns, which consisted of three stanzas, or parts; the first of which called *strophē*, was sung in turning from east to west; the other, named *antistrophē*, in returning from west to east. Then they stood before the altar, and sung the epode, which was the last part of the song. See STROPHE and ODE.

(3.) ANTISTROPHE, in grammar, a figure by which two things mutually depending on one another, are reciprocally converted; as, *the servant of the master, the master of the servant*.

(4.) ANTISTROPHE, in rhetoric, the same with which is more commonly called *epistrophe*.

* ANTISTRUMATICK. *adj.* [from *anti*, and *stroma*, a scrophulous swelling.] Good against the leucicil—I prescribed him a distilled milk, with *antistrumatics*, and purged him. *Wise man*.

ANTISYLOGISM, in logic, a syllogism, which infers a contrary conclusion to that of another syllogism:

ANTITACTÆ, or } [from *αντιτακτης*, to oppose
ANTITACTICI, } in church history, a branch of Gnostics, who held, that God was good and just, but that a creature had created evil; and consequently that it is our duty to oppose this author of evil, in order to avenge God of his adversary.

ANTITHENAR, in anatomy, a name given to divers muscles, otherwise called *adductors*, or *adductant muscles*; because they act as antagonists to the *thenars*, or *abductors*. See ANATOMY, PART II. SECT. II.

(1.) * ANTITHESIS. *n. f.* in the plural *antitheses*. [*αντιθεση*, placing in opposition.] Opposition of words or sentiments; contrast; as in these lines:

Though gentle, yet not dull,
Strong without rage, without o'erflowing, full.
Dunham.

I see a chief, who leads my chosen sons,
All arm'd with points, *antitheses*, and puns.
Pope.

(2.) ANTITHESIS, in grammar, a figure where-

by one letter is substituted in the room of another; as *olli* for *illi*.

(3.) ANTITHESIS, in rhetoric, a contrast or opposition of words or sentiments. Such is that of Cicero, in his second oration against Cataline.—“On one side stands modesty, on the other impudence; on one fidelity, on the other deceit; here piety, there sacrilege; here continency, there lust, &c.” Such also is that of Augustus to some seditious young men: *Audite, juvenes, senem, quem juvenem senes audivere*: and that of Seneca: *Curae laeves loquuntur, ingentes stupent*. St Augustine, Seneca, Salvian, and many other ancient writers, seem greatly to affect antithesis; but among the moderns they are generally decried.—Desmaretz represents them as the favourites of young writers.

ANTITHETARIUS, a term which occurs in the title of a chapter in the laws of Canute the great. It means a man who endeavours to discharge himself of the fact of which he is accused, by recriminating, i. e. by charging the accuser with the same fact.

ANTITHETIC is applied to controversy. In this sense, we meet with *antithetic method*, *antithetic discourses*, &c. Marcion composed a volume of Antitheses, or contrarieties and oppositions between the law and the gospel.

ANTITHETON, in rhetoric, a figure wherein contraries are set in opposition to each other. Some distinguish between the antithesis and antitheton. Vossius thinks that in the antitheton nouns and verbs are opposed, but in the *antithesis* epithets only. Others comprehend the antithesis under antitheton.

* ANTITHETS, contraries, or opposites.

ANTITHORA. See ANTHORA.

ANTITRAGICUS, } In anatomy; muscles of,
ANTITRAGUS, } the ear. See ANATOMY, § 195.

ANTITRINITARIANS, those who deny the Trinity, and teach that there are not three persons in the Godhead. Thus the Samosatrenians, who do not believe the distinction of persons in God; the Arians who deny the divinity of the Word; and the Macedonians, who deny that of the Holy Spirit, are all properly Antitrinitarians. Among the moderns, Antitrinitarians are particularly understood of Socinians, or Unitarians. The *Bibliotheca Antitrinitariorum*, or *Antitrinitarian Library*, is a posthumous work of Christopher Sandius, an eminent Antitrinitarian; wherein he gives a list, digested in order of time, of all the Socinian or modern Antitrinitarian authors, with a brief account of their lives, and a catalogue of their works. See UNITARIAN.

(1.) * ANTITYPE. *n. f.* [*αντιτυπη*.] That which is resembled or shadowed out by the type; that of which the type is the representation. It is a term of theology. See TYPE.—When once upon the wing, he soars to an higher pitch, from the type to the *antitype*, to the days of the Messiah, the ascension of our Saviour, and, at length, to his kingdom and dominion over all the earth. *Burnet's Theory*.—He brought forth bread and wine, and was the priest of the most high God; imitating

imitating the *antitype*, or the substance, Christ himself. *Taylor*.

(2.) **ANTITYPE**, among divines, is variously interpreted. It occurs twice in the New Testament; viz. in the Epistle to the Hebrews, ix. 24. and in St Peter, 1 Ep. iii. 21. where its genuine import has been much controverted. The former says, that "Christ is not entered into the holy places made with hands, which are *antitypes*, the figures or antitypes of the true—now to appear in the presence of God for us." Now *τυπος*, signifies the pattern by which another thing is made; and as Moses was obliged to make the tabernacle, and all things in it, according to the pattern showed him in the mount; the tabernacle so formed was the antitype which was shown to Moses; any thing, therefore, formed of a model or pattern, is an antitype. In the latter passage, the Apostle, speaking of Noah's flood, and the deliverance only of eight persons in the ark from it, says, *οὐ καὶ ἡμεῖς ἀντίτυποι τοῦ ὅτι ἐστί βαπτισμα, baptism, being an antitype to that, now saves us; not putting away the filth of the flesh, but the answer of a good conscience towards God, &c.* The meaning is, that righteousness, or the answer of a good conscience towards God, now saves us by means of the resurrection of Christ, as formerly righteousness saved those eight persons by means of the ark, during the flood. The word *antitype*, therefore, here signifies a general similitude of circumstances; and the particle *οὐ*, *whereunto*, refers, not to the immediate antecedent, *ὕδατος*, *water*, but to all that precedes.

(3.) **ANTITYPE**, among the ancient Greek fathers, and in the Greek liturgy, is also applied to the symbols of bread and wine in the Sacrament. Hence it has been argued, by many Protestants, that the Greeks do not really believe the doctrine of transubstantiation; because they call the bread and wine *antitypes*, *αντίτυπα*, q. d. figures, similitudes; and this even after the consecration.

* **ANTITYPICAL**. *adj.* [from *antitype*.] That which relates to an antitype; that which explains the type.

ANTIVARI, a strong fortified town of Albania, in European Turkey, seated on a rock in the Adriatic sea. It was taken from the Venetians by the Turks, in 1573. It is the see of a Greek Archbishop, and lies 10 miles W. of Dulcigno. Long. 19. 40. E. Lat. 42. 10. N.

* **ANTIVENEREAL**. *adj.* [from *anti*, and *venereal*.] Good against the venereal disease.—If the lues be joined with it, you will scarce cure your patient without exhibiting *antivenereal* remedies. *Wifeman*.

ANTIVETRIA, a subdivision of New Castile in S. America, situated S. of Carthagena.

ANTIUM, in ancient geography, a city of the Volsci, situated on the Tuscan sea, yet without a harbour, because they had a neighbouring hamlet, called *Ceno*, with a harbour. The Romans gained their first reputation in naval affairs against the Antiates; part of whose ships they conveyed into the arsenal of Rome and part they burnt; and with their beaks of rostra adorned the pulpit erected in the Forum, thence called *Rostra*. Here stood a famous temple of Fortune. Addison says, there were two Fortunæ worshipped at Antium.

It was destroyed by the Saracens, and is now extinct, but a vestige of the name still remains in *Capo d'Anzo*, or **ANTIO**.

ANTIUS, a son of Hercules, said to have been the founder of **ANTIUM**.

(1.) * **ANTLER**. *n. s.* [*andouillier*, Fr.] Properly the first branches of a stag's horns; but popularly and generally, any of his branches.—Grown old, they grow less branched, and first lose the brow *antlers*, or lowest furcations next to the head. *Brown*.—

A well grown stag, whose *antlers* rise
High o'er his front, his beams invade the skies
Dryden

Bright Diana
Brought hunted wild goat's heads, and branching
antlers.

Of stags, the fruit and honour of her toil. *Pope*
(2.) **ANTLER**, among sportsmen, a first branch of a deer's attire. See § 3. and 4.

(3.) **ANTLER BES**, the branch next above the brow-antler.

(4.) **ANTLER BROW**, the branch next the head.
ANTLIA, an ancient machine, supposed to be the same with the pump. Hence the phrase, *antlium condemnari*, according to the critics, denotes a kind of punishment, whereby criminals were condemned to drain ponds, ditches, or the like.

ANTOCOW, in farriery, a swelling in the breast of a horse.

* **ANTOECI**. *n. s.* It has no singular. [It is from *anti* and *oeci*, to inhabit.] In geography, those inhabitants of the earth, who live under the same meridian, and at the same distance from the equator; the one toward the north, and the other to the south. Hence they have the same longitude, and their latitude is also the same, but of a different denomination. They are in the same semicircle of the meridian, but opposite parallels. They have precisely the same hours of the day and night, but opposite seasons; and the night of the one is always equal to the day of the other. *Chambers*.

(1.) **ANTOINE**, a town of France, in the department of Isere, with a celebrated abbey. It is seated among the mountains, 13 miles E. of Lyon. Long. 5. 15. E. Lat. 45. 43. N.

(2.) **ANTOINE**, ST, a fort of Corunna.

ANTOINETTE, MARIE, the late unfortunate queen of France. See FRANCE and LAW XVI.

ANTOMOSIA, [from *anti*, and *omos*, I swear] in ancient writers, an oath taken by both the parties in a criminal accusation; whereby the accused charged the other with the fact, and the accused in his turn, denied the same. Others say, *antomosia* differed from *diomosia*, *antomosia* signifying the oath of the person accused, whereby he engaged to make a fair defence; and *diomosia* to the prosecutor's oath, whereby he swore that his accusation was justly founded.

ANTONA, a river of Britain, mentioned by Tacitus, which Camden supposes to be a Latin reading for *Avuona*, or *Aufona*, the Avon.

ANTONACUM, **ANTONNACUM**, or **ANTONACUM**, a town of the Treveri; now *Andenac* below Coblentz. Long. 7. 5. E. Lat. 50. 20. N.
ANTON

Susanna Bermans, a minister's daughter, who had also a talent for poetry. His marriage was celebrated by several eminent poets, particularly by the famous Peter Francius, professor of eloquence, who composed some Latin verses on the occasion. After marriage, he did not much indulge his poetic genius; and within a few years he fell into a consumption, of which he died in 1684, being only 37 years, and a few months old. He is esteemed the most eminent Dutch poet after Vondel. His works have been printed several times, having been collected by father Anthony Tansz. The last edition was printed by Nicholas Ten Hoom, at Amsterdam, in 1714, in 4to, under the direction of David Van Hoogstraaten, one of the masters of the Latin school of that city, who added to it the life of the poet.

ANTONINA, the infamous wife of the great Belisarius, who not only repeatedly dishonoured her husband, by her infidelities, but persecuted her own son Photius, with the utmost virulence, because he had discovered her intrigues, and revealed them to his injured stepfather. In the language of Mr Gibbon, who gives her secret history at large, in his 4th volume of the Decline and Fall of the Roman Empire, "she was, in the various situations of fortune, the companion, the enemy, the servant, and the favourite of the empress Theodora," a woman as wicked and worthless as herself. "These loose and ambitious females," adds Gibbon, "had been connected by similar pleasures: they were separated by the jealousy of vice, and at length reconciled by the partnership of guilt."

ANTONINE COLUMN. See ANTONINUS, N° 3.

(1.) ANTONINUS, Aurelius Fulvius, surnamed Pius, the Roman emperor, was born at Lanuvium in Italy, A. D. 86, of a family originally from Nîmes in Languedoc. His character was in all respects one of the noblest that can be imagined; and he had the title of *Pius* given him by the senate. We have no regular account of the transactions of his reign, as Capitolinus has written in a very confused manner; and we have only an abridgement of Dion Cassius's history by Xiphilin now remaining. He managed the public revenues with great frugality, yet was extremely generous; was fond of peace, and in war preferred the reputation of justice to all the advantages which might be gained by victory. He was more intent upon preserving the bounds of his empire than extending them; and he often made use of Scipio's expression, That he chose rather to save one citizen than kill a thousand enemies. By this conduct he made himself universally esteemed and revered in that age, and admired by posterity. This great and good emperor died in 161, aged 75, having reigned 23 years.

(2.) ANTONINUS, Marcus Aurelius, surnamed THE PHILOSOPHER, the Roman emperor, born at Rome, the 26th of April, A. D. 121. He was called by several names till he was admitted into the Aurelian family, when he took that of Marcus Aurelius Antoninus. Adrian, upon the death of Cejonius Commodus, turned his eyes upon Marcus Aurelius; but, as he was not then 18 years of age, and consequently too young for so important a

station, he fixed upon ANTONINUS PIUS, (See N° 1.) whom he adopted, upon condition that he should likewise adopt Marcus Aurelius. The year after this adoption, Adrian appointed him questor, though he had not yet attained the age prescribed by the laws. After the death of Adrian, Aurelius married Faustina, the daughter of Antoninus Pius, by whom he had several children. In the year 139, he was invested with new honours by the emperor in which he behaved in such a manner as endeared him to that prince and the whole people. Upon the death of Pius, which happened in 161, he was obliged by the senate to take upon him the government; in the management of which he took Lucius Verus as his colleague. Dion Cassius says that the reason of doing this was, that he might have leisure to pursue his studies, and on account of his ill state of health; Lucius being of a strong vigorous constitution, and consequently more fit for the fatigues of war. The same day he took upon him the name of Antoninus, which he gave likewise to Verus his colleague, and betrothed his daughter Lucilla to him. The two emperors went afterwards to the camp; where, after having performed the funeral rites of Pius, they pronounced each of them a panegyric to his memory. They discharged the government in a very amicable manner. It is said that, soon after Antoninus had performed the apotheosis of Pius, petitions were presented to him by the pagan priests, philosophers, and governors of provinces, in order to excite him to persecute the Christians; which he rejected with indignation, and interposed his authority for their protection, by writing a letter to the common assembly of Asia, then held at Ephesus. Eusebius has preserved a copy of the letter, (*Hist. Ecc. lib. iv. c. 13.*) which he ascribes by mistake to Antoninus Pius. The happiness which the empire began to enjoy under the two emperors was interrupted, in the year 165, by a dreadful inundation of the Tiber, which destroyed a vast number of cattle, and occasioned famine at Rome. This calamity was followed by the Parthian war; and at the same time the Catti ravaged Germany and Rhætia. Lucius Verus went in person to oppose the Parthians; and Antoninus continued at Rome, where his presence was necessary. During this war with the Parthians, about the year 163 or 164, Antoninus sent his daughter Lucilla to Verus, she having been betrothed to him in marriage, and attended her as far as Drundusium: he intended to have conducted her to Syria; but it having been insinuated by some persons, that his design of going into the east was to claim the honour of having finished the Parthian war, he returned to Rome. The Romans having gained a victory over the Parthians, who were obliged to abandon Mesopotamia, the two emperors triumphed over them at Rome in 166; and were honoured with the title of *Fathers of their country*. This year was fatal, on account of a terrible pestilence which spread itself over the whole world, and a famine under which Rome laboured: it was likewise in this year that the Marcomanni, and many other people of Germany took up arms against the Romans; but the two emperors having marched in person against them, obliged the Germans to sue for peace. The war

however

the Roman territories to the north in Britain. For Antoninus Pius, having, by his lieutenant Lollius Urbicus, recovered the country once conquered by Agricola, commanded another rampart to be erected between the friths of Forth and Clyde, in the tract where Agricola had formerly built his chain of forts. The great number of inscriptions which have been found in or near the ruins of this wall, to the honour of Antoninus Pius, leave us no room to doubt its having been built by his orders. If the fragment of a Roman pillar with an inscription, now in the college library of Edinburgh, belonged to this work, as it is generally supposed to have done, it fixes the date of its execution to the third consulship of Antoninus, which was A. D. 140, only 20 years after that of Adrian, of which this seems to have been an imitation. This wall, as some imagine, reached from Caer-ridden on the frith of Forth, to Old Kirkpatrick on the Clyde; or, as others think from Kinniel on the E. to Dunglass on the W. These different suppositions hardly make a mile of difference in the length of this work, which, from several actual mensurations, appears to have been 37 English or 40 Roman miles. Capitolinus, in his life of Antoninus Pius, affirms, that the wall which that emperor built in Britain was of turf. This is unquestionably true; though it is evident from the vestiges of it still remaining, (which not very many years ago were dug up and examined for near a mile together) that the foundation was of stone. Mr Camden also tells us, from the papers of one Mr Anthony Pont, that the principal rampart was faced with square stone, to prevent the earth from falling into the ditch. The chief part of this work were, 1. A broad and deep ditch, whose dimensions cannot now be discovered with certainty, though Mr Pont says it was 12 feet wide. 2. The principal wall, about 12 feet thick at the foundation, but its original height cannot now be determined. This wall was situated on the S. brink of the ditch. 3. A military way on the S. side of the principal wall, well paved, and raised a little above the level of the ground. This work, as well as that of Adrian, was defended by garrisons placed in forts and stations along the line of it. The number of these forts, whose vestiges were visible in Mr Pont's time, were 18, situated about two miles from each other. In the intervals between the forts, there were watch-towers; but their number and distances from each other cannot now be discovered. It is not a little surprising, that though it is now more than 1650 years since this work was finished, and more than 1300 since it was slighted, we can yet discover from authentic monuments, which are still remaining, by what particular bodies of Roman troops almost every part of it was executed. This discovery is made from inscriptions upon stones, which were originally built into the face of the wall, and have been found in or near its ruins, and are carefully preserved. The number of stones with inscriptions of this kind now extant, is 11: of which six may be seen at one view in the college of Glasgow, one in the college of Aberdeen, one in the college of Edinburgh, one in the collection of Baron Clerk, one at Cochnoch house, and one at Caldercruick. From these inscriptions it appears in ge-

neral, that this great work was executed by the second legion, the vexillations of the sixth legion and of the twentieth legion, and one cohort of auxiliaries. If these corps were all complete they would make in all a body of 7800 men. Some of these inscriptions have suffered greatly by the injuries of time and other accidents; so that we cannot discover from them with absolute certainty, how many paces of this work were executed by each of these bodies of troops. The sum of the certain and probable information contained in these inscriptions, as it is collected by the learned Mr Horsley, stands thus:

	Paces
The second legion built	11,000
The vexillation of the sixth legion	7,411
The vexillation of the twentieth legion	7,800
<hr/>	
All certain	26,811
The vexillation of the 20th legion, the monument certain, and the number probable	3,411
The same vexillation, on a plain monument, no number visible, supposed	3,500
The sixth legion, a monument, but no number, supposed	3,000
Cohors prima Cugernorum	3,000
<hr/>	
Total	39,722

or 39 miles 726 paces, nearly the whole length of the wall. It would have been both useful and agreeable to have known how long time the troops were employed in the execution of the great work. But of this we have no information. Neither do we know what particular bodies of troops were in garrison in the several forts and stations along the line of this wall, because these garrisons were withdrawn before the *Notitia Imperii* was written. Though we cannot discover exactly how many years this wall continued to be the boundary of the Roman territories in Britain, yet we are certain it was not very long. For we are told by Dion Cassius, that, "Commodus, the son of ANTONINUS, (N^o 2) had wars with several foreign nations, but none so dangerous as that of Britain. For the people of the island, having passed the wall which divided them from the Romans, attacked them, and cut them in pieces." This was about A. D. 180.

(1.) ANTONIO, Nicholas, knight of the order of St James and canon of Seville, was born at Seville in 1617, being the son of a gentleman to whom Philip IV. made president of the admiralty in that city in 1626. After having gone through a course of philosophy and divinity in his own country, he went to study law at Salamanca, where he attended the lectures of Francisco Ramos del Manzano, afterwards counsellor to the king and preceptor to Charles II. Upon his return to Seville, he employed himself several years in writing his *Bibliotheca Hispanica*, having the use of the books of Bennet de la Sana, abbot of the royal monastery of Benedictines. In 1659, he was sent to Rome by Philip IV. in the character of agent-general: he had also particular commissions from the inquisition of Spain, the viceroy of Naples and Sicily, and the governor of Milan, to negotiate their affairs at Rome. The cardinal

tion, than his eloquence made him universally admired. He was killed during those bloody confusions raised at Rome by Marius and Cinna. He was discovered in the place where he hid himself, and soldiers were sent to dispatch him; but his manner of addressing them had such an effect, that none but he who commanded them, and had not heard his discourse, had the cruelty to kill him. His head was exposed before the rostra, a place which he had adorned with his triumphal spoils. This happened A. A. C. 90.

(5.) ANTONIUS, Marcus, the triumvir, grandson to the former, was very handsome in his youth; for which he was greatly beloved by Curio a senator; who, by carrying him about in all his debaucheries, made him contract such heavy debts, that his own father forbade him his house. Curio, however, was so generous as to bail him for 250 talents. When the civil war broke out, Curio took Cæsar's party, and prevailed with Antonius to do the same; for which he was made a tribune of the people, and in that office did Cæsar great service. Cæsar, having made himself master of Rome, gave Antonius the government of Italy: at the battle of Pharsalia, Cæsar confided so much in him, that he gave him the command of the left wing of his army, whilst he himself led the right. After Cæsar was made dictator, he made Antonius general of the horie, in which station he exerted his power with the utmost violence. He was made consul, when Cæsar enjoyed that honour for the fifth and last time. On Cæsar's death, he harangued the populace with great art, and raised their fury against his murderers; flattering himself, that he should easily get into the place which Cæsar had filled: but his haughty behaviour made him lose all the advantages his affected concern for Cæsar had gained him. His ill treatment of Octavius, and quarrel with him, produced another civil war; which ended in an accommodation between him, Octavius, and Lepidus, fatal to the peace of Rome. They agreed to share the supreme power among them; and many of the most illustrious Romans were sacrificed by proscription, to cement this bloody league, which is known by the name of the *Second Triumvirate*. But the triumvirs were too ambitious, and hated one another too much, to be long united. Antonius went into Asia to raise money for his soldiers; during his absence, Fulvia his wife quarrelled with Octavius. When Antonius was in Asia, indulging himself in all manner of luxury, the famous Cleopatra inspired him with the most violent passion. Hearing of the quarrel between Fulvia and Octavius, and finding Octavius was become publicly his enemy, Antonius entered into a confederacy with Sextus Pompeius, who was still master of Sicily. He then went into Italy, to fight Octavius; but Fulvia, who had been the promoter of this war, dying, Octavius and Antonius came to an agreement. One of the conditions of this new peace was, that they should together attack Pompey, though the former had lately made an alliance with him. Antonius then married Octavia, sister to Octavius, as a pledge of their renewed friendship; but returned soon after to his beloved Cleopatra, and lived with her in Alexandria. Octavi-

us took hold of this pretence to inveigh against him, and begin the war again. At last, they engaged in a sea-fight at Actium, in which Octavius gained a complete victory. The infatuated Antonius fell upon his own sword; and Cleopatra hung herself to death with an asp, to avoid gracing the victor's triumph at Rome.

* ANTONOMASIA. *n. s.* [from *anti*, and *masia* a name.] A form of speech, in which, for a proper name, is put the name of some dignity, office, profession, science, or trade; or when a proper name is put in the room of an appellative. Thus a king is called his majesty; a nobleman his lordship. We say the philosopher, instead of Aristotle, and the orator for Cicero; thus, a man is called by the name of his country, a German an Italian; and a grave man is called a Cato, and a wise man a Solomon. *Smith's Rhetorick*.

ANTONOMASTICALLY. *adv.* Performed by the figure antonomasia.

ANTONOWOSKOI ГОРКА, a village of Novogorod, in Russia, with a convent in it.

ANTON'S KLOSTER, ST, a town in Russia.

ANTOPHYLLUS, in botany, the fruit of the clove tree.

ANTOSIANERIANS, a sect of rigid Lutherans, who oppose the doctrine of Osiander, relating to justification. These are otherwise denominated Osiandromastiges. The Antosianerians deny that man is made just, with that justice wherewith God himself is just; that is, they assert, that he is not made essentially, but only putatively, just; or, that he is not really made just, but only pronounced so.

ANTRAIN, a town of France, in the department of Isle and Vilaine, seated on the Cenou on the borders of the ci-devant province of Normandy, 15 miles S. of Avranches. Long. 1. 48. E. Lat. 48. 33. N.

* ANTRE. [*antre*, Fr. *antrum*, Lat.] A cavern; a cave; a den: not in use.—

With all my travels history:

Wherein of *antres* vast, and deserts idle,

It was my bent to speak.

Shakspeare

(1.) ANTRIM, a county of Ireland, in the province of Ulster, and the most northerly one in the island. It is bounded by that of Down on the S. E. those of Tyrone, and Londonderry on the W. (from which last it is separated by the river Bann, part of Armagh on the S. St George's channel on the E. and the Deucalionian ocean on the N. Its greatest length is about 46 miles, its greatest breadth about 27; and the number of acres it contains, plantation measure, are computed at 383,000. Though the country is much incumbered with bogs, and marshes, yet it enjoys pretty good air, and is well peopled, chiefly with protestants. Where it is free from bogs the soil is fruitful. It sends two members to parliament for the shire, and two for each of the following towns, viz. Lisburn, Belfast, Antrim, and Ramothstown. Certain narrow valleys, called *glens*, beginning here, and running a great way along the coast, belonged formerly to the Bissets, noblemen of Scotland, who, having been obliged to quit that country for having assassinated Patrick earl of Argyll upon a private quarrel, came hither, and had a great estate bestowed upon them by Henry III.

Jesuit's church is extremely magnificent, and the chapel of the Virgin, joining to it, still more so. Among the cloisters the most remarkable are, the noble and rich abbey of St Michael, on the banks of the Scheldt, the apartments of which are truly royal, and in which all sovereign princes that pass this way actually lodge; and the English nunnery, of the order of St Teresa, the nuns of which lie upon straw, and never wear linen, nor eat flesh; the grates of the convent are so dismal, that it looks like a prison. The city is environ'd with a fine wall, planted with rows of trees on each side, with walks between, broad enough for two coaches to go abreast; and is also defended by a very strong, large, regular citadel, in form of a pentagon, erected by the Duke of Alva, in 1568, which commands the town and the neighbouring country. The magistracy of this city is chosen only out of the 7 patrician families; and consists of two burgomasters and 18 echevins, besides inferior magistrates. Among the privileges granted to it by its princes, there is one by which every native is a citizen, though both his father and mother were foreigners.

(3.) ANTWERP HISTORY OF. In 1685, Antwerp underwent a remarkable siege by the Duke of Parma. It was then the most wealthy city in the Netherlands, and had long been the object of his designs; but the difficulties attending the enterprize obliged him to postpone it for a considerable time. In order to succeed, it was necessary to cut off the communication of the city with Holland, Ghent, and all places above and below Antwerp on the Scheldt. To effect this, he laid siege to Liskenshouk and Tillo, places of the utmost consequence to the security and commerce of the city: both were obstinately defended; and the siege of the latter was raised, after it had been carried on for 3 months: however, the Duke gained several other posts on the river, where he built forts and greatly annoyed the shipping and trade of the city. He next laid siege to Dendermonde, in order to cut off the communication with Ghent, in which he succeeded by the reduction of the town. His next attempt was on Vilvorde: this place he took by assault, and thereby cut off the communication with Brussels. Finding, however, this method of hemming in the city tedious, and ineffectual while an opening to the mouth of the river remained, he formed a design of building a bridge across the Scheldt, the extremities of which were to be defended by strong forts and outworks.—He began with collecting great quantities of wood at Callo and fort St Philip, where he intended the bridge should be built; but his project was for some time retarded by the Antwerpers, who broke down the dykes, overflowed the whole country, and carried off his magazines by the inundation. Not discouraged by this loss, he applied himself diligently to repair it, and with incredible expedition cut out a canal from Steken to Callo, by which he carried off the waters. He then set to work upon the bridge, and finished it in seven months, without any interruption from the Zealanders. During the building of this bridge, Aldegone, governor of Antwerp, proposed to build a fort on Couvensteyn dyke, in order to secure that important post, and then breaking down the

dyke when the bridge was near finished: but he was violently opposed by certain citizens, who apprehended that their lands and villas would be destroyed by the inundation. This unseasonable opposition, with the negligence of the magistrates who, because the markets were high, had not laid in a sufficient stock of corn, occasioned the loss of the city. However, in despite of all the Duke of Parma's precautions, the Zealanders found means to throw in a convoy of corn; but the citizens knowing they would not run the risk of carrying it back again, so cheapened the price, that the bold traders refused ever to bring their goods again to so bad a market. The Antwerpers, having thus through avarice brought on their ruin, began in a short time to suffer by famine; they then pressed the Zealanders to attempt something for their relief, but it was now too late. While the magistrates were deliberating on some means for destroying the bridge, which they might have prevented from being ever completed, one Ginebelli, a Mantuan engineer, offered his services, undertaking at a certain expence to blow it into the air. Even in this extremity the expence was grudging: but necessity at last overcame this obstacle. Ginebelli was furnished with two large vessels, a number of small boats, and every thing necessary. He formed the two large vessels into fire ships, which he set a-drift with the stream, deceiving the enemies by means of false fires lighted up in the fleet of small boats. The train of one of the fire-ships was expended before the time expected, and she blew up with a terrible explosion, but with little damage to the bridge. The other was more successful, carrying off all the out-works; setting fire to the whole bridge, and burying about 500 soldiers in the ruins it made. The fire, however, was soon extinguished, and the bridge repaired by the Duke of Parma, while the Antwerpers were prevented by avarice from repeating the experiment; so that they were soon reduced to the greatest straits and obliged to surrender. It is said that the city of Amsterdam had obstructed every measure for the relief of Antwerp, hoping to profit by its destruction. It was not doubted but the Protestants would forsake it as soon as it fell into the hands of an arbitrary Catholic prince; and this conjecture was soon fulfilled by the removal of many families with their effects to Amsterdam.—After the battle of Ramillies, the city of Antwerp surrendered to the Duke of Marlborough. It was taken by the French in 1746, but restored to the house of Austria at the treaty of Aix-la-Chapelle. It was retaken by the French republican army in July 1794, along with the rest of the Austrian Netherlands; the Duke of York being obliged to abandon the defence of it, after the defeat of the Prince of Cobourg, and his retreat towards Maestricht.

ANTWERPERS, the inhabitants of ANTWERP. See § 3.

ANTYLION, in the ancient pharmacy, a kind of astrigent malagma, described by Ægineta.

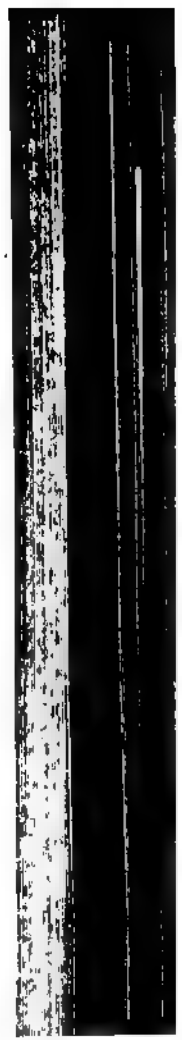
ANTYX, [from ἀντιξ,] in antiquity, the outermost round or circumference of a shield.

(I. 1.) ANUBIS, a symbolical deity of the Egyptians, generally represented in the form of a man with a dog's head, bearing a branch of palm in

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e consecrated to
all religious cere-
monies, situated
in honour of Anu-
is worshipped no
wated his festivals
sacred the dog
son. "Anubis,
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animals are fed
igies has decreed
however, related
considerable dis-
s having slain the
r into a field, all
legs, which along
minished the po-
not the only city
us of Anubis. He
ples. On festi-
sided those of his
nd the ceremonies
died, to celebrate
and himself
e of this god was
well as the statu-
Anubis signifies
mysterious; and
en it without rea-
OP, explained
tical deity is thus
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res, and which is
ving the name of
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at animal watches
Alexandria, who
e theology of the
n. The two dogs,
e symbols of two
terrestrial globe,
hens person that
ans of men, indi-
he sun on the S,
ag to the former
priests, regarding
s statue; to mark,
it rays of the sun,
on his rising, and
left rays upon the
sables, that Anu-
gitimate. In fact,
owed light; and
s, as the father of
sipping of Osiris,
horizon turning
e companion. In
where Anubis re-
faithful guardian
rle of the sun and
the circles where
They neither de-
finites assigned
erence, in hiero-
red by a divinity

with the head of a dog, was seemed to oppose
their passage on the side of the two poles. The
other opinion, notwithstanding, seems more na-
tural, and to be more analogous to the ideas of
the priests. Upon the whole, it would seem, that
Anubis at first was only a symbolical image, in-
vented by astronomers to give a sensible expression
of their discoveries; that afterwards, the people,
accustomed to see it in their temples, which were
the depositories of science, adored as a deity; and
that the priests favoured their ignorance by
connecting it with their religion. The worship
of Anubis introduced that of the dog, as his em-
blem. Perhaps many of the gods of the Gentiles
originated in this manner.
(II.) ANUBIS, in geography, a city of Egypt.
See ANUBIS, No. I.
ANVEILER, a town of France, in the depart-
ment of the Lower Rhine, seated on the Quich,
above Landau.
ANVERS-LE-HAMON, a town of France in
the department of Sarre. Long. α . 19. E. Lat.
47. 43. N.
(1.) ANVIL. *a. f. [anvili, Sax.]* 1. The iron
block on which the smith lays his metal to be for-
ged.—
I saw a smith stand with his hammer, thus,
The whilst his iron did on his anvil cool. *Shak.*
On their eternal anvils here he found
The brethren beating, and the blows go round.
Dryden
2. Any thing on which blows are laid.—
Here I clip
The anvil of my sword, and do contest
Holy and nobly *Shak. Spent.*
3. Figuratively; to be upon the anvil, is to be in
a state of fermentation or preparation.—Several mem-
bers of our house knowing what was upon the
anvil, went to the clergy, and desired their judg-
ment. *Swift.*
(2.) ANVIL DESCRIBED. The face or upper-
surface must be very flat and smooth, without
flaws, and so hard that a file will not touch it.
At one end there is sometimes a pike, decken, or
hook iron, for the rounding of hollow work. The
whole is usually mounted on a firm wooden block.
—Forged anvils are better than those of cast work,
and the best have the upper part made of steel.—
Locksmiths have a smaller kind of anvil called the
saber, which is moveable, and placed ordinarily on
their work-bench. Its use is for setting small cold
work straight, or to cut or punch on with the cold
chisel or cold punch.
(1.) ANUS, in anatomy, the lower extremity of
the intestinum rectum, or orifice of the fundam-
ent. See ANATOMY, Index. Also a small hole
in the 3d ventricle of the brain.
(2.) ANUS, DISEASES OF THIS, are a fistula,
and the proctodermis, or proleptus ani; to which
may be added the hemorrhoids, or piles.
(3.) ANUS, IMPERFORATED.—When children
are born without an anus, it is very difficult to
hit on the right part for making a perforation in
the rectum, because the extremity of the gut is
generally formed into a knot. For performing
such a perforation, M. Petit recommends a trocar,
the cannula and circular plate of which are so fit
open, as to serve as a groove for a filiform to be
run





[illegible]

And since methinks, I would not grow so fast,
Because sweet flow'rs are slow, and weeds make
haste. *Shakespeare.*

He promis'd in his east a glorious race;
Now sunk from his meridian, sets *apace*. *Dryden.*
Is not he imprudent, who, seeing the tide making
haste towards him *apace*, will sleep till the sea o-
verwhelm him? *Tillotson.* 2. With haste; applied
to some action.—

The baron now his diamonds pours *apace*;
Th' embroider'd king, who shows but half his
face,
And his refulgent queen. *Pope's Rape of the Lock.*
3. Hastily; with speed: spoken of any kind of
progression from one state to another.—

This second course of men,
With some regard to what is just and right,
Shall lead their lives, and multiply *apace*. *Milton.*
The life and power of religion decays *apace* here
and at home, while we are spreading the honour
of our arms far and wide through foreign nations.
Atterbury.—If sensible pleasure, or real grandeur,
be our end, we shall proceed *apace* to real misery.
Watts.

APACHES, } a people of New Mexico in North
APACI, } America. They are brave, reso-
lute, and warlike, fond of liberty, and the in-
veterate enemies of tyranny and oppression. Of
this disposition the Spaniards had fatal experience
towards the end of the last century, when they re-
volted against the Catholic king, massacred several
of his officers, and committed the greatest devas-
tations. Ever since, they have remained the al-
lies, not the subjects, of the Spaniards; and the
viceroy of Mexico has been obliged to maintain a
more formidable garrison, and a greater number
of troops.

APÆDEUTÆ, illiterate persons. This term
was particularly used among the French in the
time of Huet; when the men of wit at Paris were
divided into two factions, one called by way of
reproach, *apædeutæ*, and the other *eruditi*. The
apædeutæ are represented by Huet, as persons
who, finding themselves either incapable or un-
willing to undergo a severe course of study, in or-
der to become truly learned, conspired to decry
learning, and turn the knowledge of antiquity in-
to ridicule, thus making a merit of their own in-
capacity. The *apædeutæ*, in fact, were the men of
pleasure; the *eruditi* the men of study. The *ape-
deutæ* preferred the modern writers to the ancient,
to save themselves the trouble of studying the lat-
ter. The *eruditi* derided the moderns, and valued
themselves wholly on their acquaintance with the
ancients. Neither party were entirely in the right.

APÆDUSIA, [from *α*, and *παῖς*, instruction,]
ignorance or unskilfulness in what relates to learn-
ing and the sciences.

APAFALVA, a village in Transylvania.

APAGMA, a term used, by some writers in
chirurgery, for the thrusting of a bone, or other
part out of its proper place. But it is more pro-
perly used for a fracture of a bone at or near the
+ whereby it is articulated with another.

.) APAGOGE, [from *αγω*, and *αγω*, I bear,]
the ancient Athenian law, the carrying a crimi-
nal in the fact, to the magistrate. If the
magistrate was not able to bring him to the magis-

trate, it was usual to take the magistrate along
with him to the house where the criminal lay con-
cealed, or defended himself.

(2.) APAGOGE, in logic. See ABDUCTION.

(3.) APAGOGE, in mathematics, is sometime
used to denote a progress or passage from one pro-
position to another; when the first having been
once demonstrated, is afterwards employed in the
proving of others.

* APOGOGICAL. *adj.* [from *απογωγη*; com-
pounded of *απο*, from, and *αγω*, to bring or draw.
An *apogogical* demonstration is such as does not
prove the thing directly; but shews the impossibil-
ity, or absurdity, which arises from denying it,
and is also called *reductio ad impossibile*, or *ad ad-
surdum*. *Chambers.*

APAID, paid. *Chauc.*

To APAIR. *v. a.* To impair. *Chauc.*

APALACHE, a river in Florida.

APALACHES, } a nation of Indians in Florida.
APALACHI, }

APALACHIAN MOUNTAINS, more properly
called the ALLEGANY MOUNTAINS, have their
southern beginning near the bay of Mexico, in the
latitude of 30°, extending northerly on the back
of the British colonies, and running parallel with
the sea coast to the latitude of 40° N. but the
distance from the sea, on the W. is not exactly
known, though it is generally thought to be about
200 miles. A great part of these mountains are
covered with rocks, some of which are of a stupen-
dous height and bulk; the soil between them
is generally black and sandy, but in some places
differently coloured, and composed of pieces of
broken rock and spar, of a glittering appearance,
which seem to be indications of minerals and ore,
if proper search was made for them. Chestnut
and small oaks are the trees that principally grow
on these mountains, with some *chinkapin* (or *Fa-
gus PUMILA*, which see,) and other small shrubs.
The grass is thin, mixed with vetch and small
pease; and in some places there is very little vege-
table appearance. The rocks of the Apalachian
mountains seem to engross one half of the surface.
They are mostly of a light grey colour; some are
of a coarse-grained marble like alabaster; others
of a metallic lustre: some pieces are in the form
of slate, and brittle; others in lumps, and hard,
and some appear with spangles, or covered over
with innumerable small shining specks, like silver.
These frequently appear at the roots of trees when
blown down. The different spars are found mostly
on the highest and steepest parts of the hills, where
there is little grass and few trees; but the greater
part of the soil between the rocks is generally a
dark sandy coloured kind of mould, and shallow,
yet fertile, and productive of good corn, which
encourages the Tallipooses, a clan of the Chero-
kee Indians, to settle among them in latitude 34°
and they are the only Indian nation that has a
constant residence upon these mountains. See
ALLEGANY and AMERICA, § 8 and 42.

APALACHICOLA, a river of North America.

APALACHINE, in botany, a name given by
some authors to the shrub *cassine vera Floridana*,
of other writers. This plant is used as tea,
and celebrated for many virtues.

.. APALACHTY-COLA, a harbour in Florida.
APALOUSA,

[*log.*] The quality of not feeling; exemption from passion; freedom from mental perturbation.—

Of good and evil much they argued them,
Passion, and *apathy*, and glory, and shame.

Milton.

To remain insensible of such provocations, is not constancy, but *apathy*. South.

In lazy *apathy* let stoicks boast

Their virtue fix'd; 'tis fix'd as in frost,

Contracted all, retiring to the breast;

But strength of mind is exercise, not rest. Pope.

(2.) *ΑΠΑΘΗΥ*, among the ancient philosophers, implied an utter privation of passion, and an insensibility of pain. The Stoics affected an entire *apathy*: they considered it as the highest wisdom to enjoy a perfect calmness or tranquillity of mind, incapable of being ruffled by either pleasure or pain. In the first ages of the church, the Christians adopted the term *apathy* to express a contempt of all earthly concerns; a state of mortification, such as the gospel prescribes. Clemens Alexandrinus, in particular, brought it exceedingly in vogue; thinking hereby to draw the philosophers to Christianity, who aspired after such a sublime pitch of virtue. Quietism is only *apathy* disguised under the appearance of devotion.

ΑΠΑΤΥΡΙΑ, [from *απατη*, fraud,] in antiquity, a solemn feast celebrated by the Athenians in honour of Bacchus. It is said to have been instituted in memory of a fraudulent victory obtained by Melanthus, king of Athens, over Xanthus, king of Boeotia, in a single combat, which they agreed upon, to put an end to a debate between them relating to the frontiers of their countries. Hence Budæus calls it *festum deceptionis*, "the feast of deceit." Others tell us, that the young Athenians were not admitted into the tribes on the third day of the *apaturia*, till their fathers had first sworn, that they were their own children; and that, till that time, they were supposed, in some measure, to be without fathers, *απατρεις*; whence the feast, say they, took its name. Xenophon, on the other hand, informs us, that the relations and friends met on this occasion, and joined with the fathers of the young people who were to be received into the tribes; and that from this assembly the feast took its name: that in *απατεια*, the *α*, far from being a privative, being here a conjunctive, signifies the same thing with *συν*, together. This feast lasted four days: the first day, those of the same tribe made merry together; and this they called *δωρεια*. The second day, which they called *αναγευεις*, they sacrificed to Jupiter and Minerva. The third day, which they called *αρεσιωεις*, such of their young men and maids as were of age were admitted into their tribes. The fourth day they called *σπιβδης*.

ΑΠΑΥΛΕΤΕΡΙΑ, in antiquity, a garment presented by the bride to the bridegroom, on the 2d or 3d day of a marriage. See next article.

ΑΠΑΥΛΙΑ, in antiquity, the third day of a marriage solemnity. It was thus called, because the bride, returning to her father's house, did *απαυλιζεσθαι εν νομφιω*, lodge apart from the bridegroom. Some will have the *apaulia* to have been the second day of the marriage, viz. that whereon of ceremony was performed; thus called of contradistinction from the first day,

which was called *προαυλια*. On that day, whatever it was, the bride presented her bridegroom with garment, called *απαυληνρια*.

ΑΠΑΥΜΕ, in heraldry, a hand opened, and full palm appearing, with the thumb and finger extended.

(1.) * *APE*. *n. f.* [*ape*, Icelandic.] 1. A kind of monkey remarkable for imitating what he sees.—I will be more newfangled than an *ape*, more giddy in my desires than a monkey. *Shakespeare*.—Writers report, that the heart of an *ape* was near the heart, comforteth the heart, and increaseth audacity. It is true, that the *ape* is a merry and bold beast. *Baron*.

With glittering gold and sparkling gems they shine,

But *apes* and monkeys are the gods within.

Granville

Celestial Beings, when of late they saw
A mortal man unfold all Nature's law,
Admir'd such knowledge in a human shape,
And shew'd a Newton, as we show an *ape*. Pope.
2. An imitator; used generally in the bad sense.—Julio Romano, who, had he himself eternity, and could put breath into his work, would beguile Nature of her custom: so perfectly he is her *ape*. *Shakespeare*.

(2.) *APE*, in zoology, the general English name of a very numerous race of animals, comprehending *Apes* properly so called, or such as want tails and *Monkeys* and *Baboons*, or such as have tails the former long, and the other short, ones. See *SIMIA*.

(3.) *APE*, *SEA*, a name given by Steller to a marine animal which he saw on the coast of America, and thus describes in his History of Kamtschatka, p. 136. "The head appeared like that of a dog, with sharp and upright ears, large eyes and with both lips bearded: the body round and conoid; the thickest part near the head: the tail forked; the upper lobe the longest: the body covered with thick hair, grey on the back, reddish on the belly. It seemed destitute of feet. It was extremely wanton, and played a multitude of monkey tricks. It sometimes swam on one side sometimes on the other side of the ship, and gazed at it with great admiration. It made so near an approach to the vessel, as almost to be touched with a pole; but if any body moved, it instantly retired. It would often stand erect for a considerable space, with one third of its body above water; then dart beneath the ship, and appear on the other side; and repeat the same thirty times together. It would frequently arise with a leopold plant, not unlike the bottle gourd, toss it up, and catch it in its mouth, playing with it numberless fantastic tricks."

* *To APE*. *v. a.* [from *ape*.] To imitate, as an *ape* imitates human actions.—

Aping the foreigners in every dress,

Which, bought at greater cost, becomes himself.

Dryden

Curse on the stripling! how he *apes* his fire
Ambitiously sententious!

Addison

* *APEAK*, or *ΑΠΕΕΚ*. *adv.* [probably from *pique*.] In a posture to pierce the ground.

ΑΠΕΧΕΜΑ, [*Απειχμα*,] in medicine, the same with *contraindure*.

APEDALE,

reptiles from
it was, the brute pretended to be
a serpent, called *apauze*.
A *PAUZE*, in heraldry, a small
feil pale appearing, with the base
extended.

(1.) A *PE*, a. f. 190, is a
of monkey remarkable for its
—I will be more awfully in
giddy in my desire than a man
—We report, that the best
near the heart, conducted to the
fifth anatomy. It is true, but the
and bold head. —

With glancing gold and silver
But eyes and monkeys are the
faint.

Celestial beings, where of the
A mortal man would all seem
And there's a world, as we
An *ape*, a word generally used
Jude Rosamond, who, had he seen
could put breath into his work,
nature of her colour. In poetry
Stoicisms.

(1.) *AP*, in zoology, the genus
of a very numerous sort of animals,
After property to collect, as he
and many and below, in his
the former lang, and the other
Sima.

(1.) *AP*, a. f. 190, a name given to
manuscript which he has in his
chicken, p. 190. The best
of a dog, with sharp and upright
and with both legs bent. The
consequently the thickest part near the
fauled, the upper side the larger
covered with thick hair, grows in the
on the belly. It formed between
extremely watery, and pines
monkey tracks. In countries where
sometimes on the other side of the
at it with great administration. It is
with a pole, but if any one
retained. It would often have
able space, with one that is
tern dart beneath the lip, and
together. It would frequently
plant, not unlike the horse, but
catch it in its mouth, playing
fantastic tricks.

(2.) *AP*, a. f. 190, a name given to
ape sometimes human and
Which, bought at great cost

Curve on the flying
Ambitiously pretends
A *PE*, in heraldry, a small
is a pale in a pale, a
A *PE*, in heraldry, a small
with constraints.

APEDALE, a village in Staffordshire, near
Stone.

APEDIA, a species of ape.

APEF, one of the new Hebrides in the S. Sea,
near Mischo, Long. 168. 30 E. Lat. 36. 15 N.

APLIDA of the Brasilians. See *SLOANIA*.

APPELEY, a village in Devonshire, near Barn-

staple.

APPELLA, among physicians, a name given
whole whose property is either wanting or thrust,
that it can no longer cover the glands. Many
have supposed this sense of the word
warranted from the passage in Horace, *cre-*

Apella, was *ape*. According to Sal-

lustro and others, *Apella* is the proper name of
certain Jew, and not an adjective signifying
cervine. But an objection naturally arises,
should the poet name this particular Jew?

In *Arctichy*, in zoology, a species of ape found
America.

APPELES, one of the most celebrated
men of antiquity. He was born in the Isle of

and flourished in the time of Alexander the
Great, with whom he was in high favour. He

executed a picture of this prince, holding a thun-

derbolt in his hand, a piece, finished with
his skill and dexterity, that it used to be said

there were two Alexanders; one invincible, the
other for her, he resigned her to him; and it

was for her that Apelles is said to have drawn
his master Anaximenes. One of Apelles's chief

excellences was, his making his pictures so exact-
ly, that the persons represented; inasmuch

as the physiognomies are said to have been able
to judge of the person's destiny, as

Apelles his portraits, as if they had seen the
original. But what is called *grace* was the

chief of this art. His pencil was so fa-
miliar in drawing fine lines, that Protogenes

was by a single line, that Apelles had been at
the drawing of this art. Protogenes lived at Rhodes

Apelles, and went to his house with great
honour, to see the works of an artist, who was

known to him only by name. Protogenes was left
at home by an old woman who was

from home, but an old woman was left
at home for painting. The old woman

was gone out, and asked him
if he might inform her master who had
sent for him. "Tell him," says Apelles,

that he is expected for by this person;—at
the same time, taking up a pencil, he drew on the

wall, a line of great delicacy. When Proto-
genes, the old woman acquainted him
with what had happened. That artist, upon con-

sidering the fine stroke of the line, immediately
perceived that Apelles had been there, for so

fine a work could be produced by no other
hand. Protogenes, however, himself drew a

line of another colour, and, as he was go-
ing, ordered the old woman to show that

to Apelles, if he came again; and say—
this is the person for whom you are enqui-

ring." Apelles returned, and saw the lines he
would not for shame be overcome; and there-
fore, in a colour different from either of the
former, he drew some lines so exquisitely delicate,

that it was utterly impossible for finer strokes to
be made. Protogenes now confessed the supe-

riority of Apelles, flew to the harbour in search of
him, and resolved to leave the canvas with the

lines on it, for the accomplishment of future artists.

Apelles showed great liberality of mind towards
Protogenes. With ideas enlarged by education

and literature, he was incapable of harbouring
little jealousies of noble competitors; on the con-

trary, he was the first who made the works of
Protogenes to be valued as they deserved, among

the Rhodians. He acknowledged that Protogenes
was in some respects superior to himself; but

that in one particular himself excelled, viz. in
knowing when to take his hand from the picture;

an art which Protogenes had not yet learned, and
therefore over-worked his pieces. Apelles equally

disapproved of too elaborate diligence, or too
hasty negligence, in execution. A Rude work

of Protogenes he esteemed less on the one ac-
count, and on the other, when a silly painter

once brought him a picture, and said, "This I
painted in a hurry,"—he replied, "Though you

had not told me so, I perceive it was painted in
haste. But I wonder you could not execute more

such pieces in the same time." There are two
stories related of Apelles, which show him to be

both an artist of modesty in ascribing even tri-
fling improvements, when pointed out to him by

competent judges, and also endowed with self con-
fidence sufficient to make him know the perfection

and value of his own paintings. It was cus-
tomary with Apelles to expose to public view the

works which he had finished, and to hide himself
behind the picture, in order to hear the remarks

passed on it by persons who chanced to view it.
He once overheard himself blamed by a shoemaker

for a fault in the slippers of some picture; he
corrected the fault which the man had noticed;

but on the day following, the shoemaker began
to admire on the legs upon which, Apelles

with some anger, looked out from behind the
canvas, and bade him keep to his own province;

"Ne futor ultra crepidam." It is well known,
that Alexander forbade any one, besides Apelles,

to paint his portrait. We are not, however, to
conclude from this, that Alexander was a more

skilful judge of painting than he was of poetry.
Like Augustus, he cherished the fine arts, more

from vanity than taste. A remarkable proof is
given of this prince's inability to discern merit,

and of the painter's freedom in expressing the
mortification he felt, when a work of his was not

sufficiently commended. "Alexander," says Al-
bani, "having viewed the picture of himself,

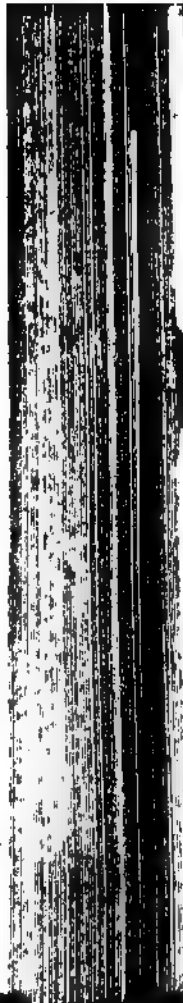
which was at Ephesus, did not praise it as it de-
served. But, when a horse was brought in, and

neighed at seeing the figure of a horse in the pic-
ture, as though it had been a real horse; O king!

(said Apelles) this horse seems to be by far a better
judge of painting than you." It happened more

than once, that the horses drawn by him, were
mistaken for real ones, by living horses, which

saw and neighed at the pictures. In finishing
a drawing



drawing of this animal, a remarkable circumstance is related of him. He had painted a horse returning from battle, and had succeeded to his wishes, in describing every other mark that could indicate a nettlesome steed, impatient of restraint; there was wanting nothing but a foam of a bloody hue, issuing from the mouth. He again and again endeavoured to express this, but his attempts were unsuccessful. At last, with vexation, he threw against the reins of the horse, a sponge, which had in it many colours; a mixture of which coming out of the sponge, and tinging the reins, produced the very effect desired by the painter. The works of Apelles were all admired; but the most celebrated were the picture of Alexander in the temple of Diana at Ephesus, and that of Venus, emerging from the sea. Alexander was drawn with thunder in his hand; and such relief was produced by the chiaroscuro in this piece, that the fingers seemed to shoot forward, and the thunder-bolt to be out of the picture. His Venus *Αφροδίτη* was esteemed the most exquisite figure which the pencil could create: it is therefore extolled by the Roman poets Propertius and Ovid; and the poet of Sidon, Antipater, has left a Greek epigram on it.

(2.) APELLES, a heretic, who flourished about A. D. 178, and appears to have been half Manichee, half Sadducee: for he taught that there was a good and a bad principle, denied the resurrection, and pretended that the prophets contradicted each other; and that Christ having received his body from the elements, left it dissolved in the air, and ascended into heaven without one!

APELLITÆ, or } Christian heretics, of the 2d
APELYTES, } century, the followers of
APELLES. See No. 2.

APENE, [*απην*, chariot,] in antiquity, a kind of chariot, wherein the images of the gods were carried in procession on certain days, attended with a solemn pomp, songs, hymns, dancings, &c. The apene, or sacred chariot of the Greeks, is called *tenfa*. It was very rich, made of ivory, or of silver, and variously decorated.

APENNAGE. See APANAGE.

APENNINUS, the APPENNINE, a mountain, or ridge of mountains, running through the middle of Italy, from N. W. to S. W. for 700 miles, in the form of a crescent: beginning at the Alps in Liguria, or the Riviera di Genoa; and terminating at the strait of Messina, or at Reggio, and the promontory Leucopetra; and separating, as by a ridge, the Adriatic from the Tuscan sea. This mountain, though high, is greatly short of the height of the Alps. Its name is Celtic, signifying a *high mountain*.

APENNIS, in ancient laws, a deed or instrument, made in favour of a person, who has lost the title deeds to his house or land by fire. In such case, an assembly of the people of the neighbourhood being called, and an exact enquiry made before the judge, another instrument was framed, to confirm and secure the person's right.

APENRADE, a town of Denmark, in the duchy of Sleswick, seated at the bottom of a gulph in the Baltic sea, between Flensbourg and Hadaschleben, 25 miles N. from Sleswick. Long. 9. 28.

Lat. 55. 4. N.

(1.) APENZEL, a canton of Switzerland, consisting of only 3 or 4 valleys; having the town and abbey of St Gall on the N. the county of Toggenburg on the W. the lordship of Sax in the canton of Zurich, and that of Gambs in the canton of Schweiz, on the S. and the Rheinthal or Rhine valley, on the E. Its greatest length is about 22 miles, and its breadth 20. It yields good pasturage, and consequently is not destitute of cattle, milk, butter or cheese. Considerable quantities also of wheat, rye, barley, oats, beans, pease, flax, and wine, are produced in it; besides a great deal of fruit, wood, and turf; with mineral waters, and warm baths. There are many mountains in the canton, the highest of which is the Hohefons, or the Hohe-Mesmer, which commands a prospect of a prodigious extent. There are also several lakes and rivers. The inhabitants, who are partly Protestants, and partly Roman Catholics, subsist chiefly by their manufactures of linen, crape, fustian and thread, or by bleaching, and the sale of their cattle, butter, cheese, horse, wood, and coal. Of the 23 parishes in the canton, 4 are Popish and 19 Protestant. Before the reformation, the inhabitants, were subject to the Abbot of St Gall but they then shook off his yoke, and united themselves with the other cantons in 1513. After this however, there were violent animosities between the Papists and Protestants, the former continually persecuting the latter, till at last, in 1587, by the mediation of the other cantons, the two parties came to an accommodation, by which certain districts were assigned to each party, whereas before they lived promiscuously together; and though these two divisions now constitute but one canton yet each forms a distinct community or free state, sending its particular representatives to the diet of the confederacy, and having its separate councils and officers. In spirituals the Papists are subject to the bishop of Constance, but the protestants to their own consistory. The militia of the former does not exceed 3000, whereas those of the latter amount to 50,000.

(2.) APENZEL, a town of Switzerland, the capital of the canton, No. 1. seated on the river Chur 25 m. S. of Constance. Long. 9. 1. E. Lat. 47. 31. N.

(1.) * APEPSY. *n. f.* [*απειψια*.] A loss of natural concoction. *Quincy.*

(2.) APEPSY may be farther defined a defect in the stomach, which prevents the aliment taken in, from affording a proper chyle for supplying the blood, and nourishing the body. Abstemiousness and excess are alike causes of indigestion. The method of treatment in the apepsy, is the same as in the anorexy. The columbo root is particularly useful, when the stomach is languid, and digestion difficult, &c. It may be given in substance with any grateful aromatic, or in Madeira wine now and then interposing gentle doses of rhubarb in tincture. A mixture of mustard seed, with the columbo root, is of great utility in cases of this nature, where acidity and flatulence prevail much in the *prima via*.

(1.) APER, in ichthyology, the name of a sea fish, called by some *Brivale* and *riondo*. It approaches very much in shape to the faber or dore but is much smaller.

(2.) APER

APEUCTIC, [from *απειχόμενος*, I deprecate,] in ancient poetry, a kind of poem or prayer preferred to God for the averting some evil; e. gr. *disprohibite minas, dii talem avertite casum, et placidi servate pios.*

APEWOOD, a village in Staffordshire, N. W. of Kinver.

APEWOOD CASTLE. See **ABBOTS CASTLE.**

(1.) * **APEX.** *n. f.* *apices*, plur. [Lat.] The tip or point of any thing.—The *apex*, or lesser end of it, is broken off. *Woodward.*

(2.) **APEX**, in antiquity, the crest of a helmet, but more especially a kind of cap worn by the *flamena*.

(3.) **APEX** is used by grammarians, for a long accent or mark, to denote that a syllable is to be pronounced long. Quintilian condemns the practice of putting the apex on all long syllables; yet in some cases he allows the apex necessary, e. gr. where the different lengths of a syllable distinguish the different senses of a word as in *malus*, which as long, or short, denotes an *ill man*, or an *apple tree*. See **ACCENT**.

APHACA, in ancient geography, a town in Syria, situated between Heliopolis and Byblus, near Lebanon; infamous for a temple of Venus, called *Aphacitis*, near which was a lake, round which fire usually burst forth, and its waters were so heavy, that bodies floated on them. The temple was destroyed by Constantine, as being a school of incontinence. The name is of Syriac origin, signifying *embraces*.

(1.) * **APHÆRESIS.** *n. f.* [*αφαίρεσις*.] A figure in grammar that takes away a letter or syllable from the beginning of a word.

(2.) **APHÆRESIS**, in medicine, denotes a necessary taking away or removal of something that is noxious. In surgery, it signifies an operation whereby something superfluous is taken away.

APHLANES: A genus of the monogynia order, belonging to the tetandria class of plants; and in the natural method ranking under the 35th order, *Sciticaea*. The essential characters are these: The calyx is divided into eight parts: there is no corolla; the seeds are two, and naked. There is only one species, viz.

APHANES ARVENSIS, or pensley-piert, a native of Britain. It is extremely common in corn-fields. The stalks rise 5 or 6 together; they are 3 inches long, round, hairy, and procumbent: the leaves stand very thick upon them, and are roundish, but divided, as it were, into 3 parts, and those deeply serrated at their edges. The flowers come out in a double series, arranged all along the branches, and are of a greenish white, and the whole plant is of a greyish or whitish green colour.

APHARSACHITES, or } See **SAMARITANS.**
APHARSATHCHITES, }

APHASIA, [from *α*, and *φημι*, I speak,] in the sceptic philosophy, denotes a state of doubt, wherein a person not knowing what to determine on, it is best for him to be silent. In this sense, *aphasia* stands opposed to *phasis*, under which are included both assertion and negation.

APHEK, the name of several cities mentioned in scripture; viz. 1. Aphek in the tribe of Judah, where the Philistines encamped, when the ark was

brought from Shiloh, which was taken by them in battle, 1 Sam. iv. 1, 2, &c. It is thought to be the same with Aphekah mentioned in Josh. xv. 5, 2. Aphek in the valley of Jezreel, where the Philistines encamped while Saul and his army were near Jezreel, upon the mountains of Gilboa; Sam. xxix. 1, &c. 3. A city belonging to the tribe of Asher, near the country of the Sidonians (Josh. xix. 30, and xiii. 4.): 4. A city of Syria, one of the principal in Benhadad's kingdom, near which the battle was fought between Ahab and Benhadad, wherein the Syrians were worsted and whereof, as they retreated with precipitation into the city, the walls fell upon them, and crushed 27,000; 1 Kings xx. 26, *et seq.* This city lay between Heliopolis and Biblos: See **APHACA**.

APHEKAH. See last article.

APHELIA, [from *αφίλιος*, simple,] in rhetoric is used to denote simplicity of diction.

* **APHELION.** *n. f.* *aphelia*, plur. [from *αφ* and *ήλιος*, the sun.] That part of the orbit or planet, in which it is at the point remotest from the sun.—The reason why the comets move not in the zodiac, is, that, in their *aphelia*, they may be at the greatest distances from one another; and consequently disturb one another's motions the least that may be. *Cheyne.*

APHELIUM. See last article.

APHERNOUSLI, a species of pine growing wild on the Alps. The timber is large, and the planks made of it are of a finer grain, and more beautifully variegated than deal; and may therefore be applied to many uses. It grows in bleak and barren ground, and most resembles that which is called in England the Weymouth pine.

APHESIS [from *αφίμι*, I remit,] in the Athenian laws, was applied to the case of a person deeply indebted, who desired the people to remit part of the debt, on account of his disability to make payment. Voetius has a dissertation on the words *aphesis* and *parexis*, and their difference.

* **APHETA.** *n. f.* [with astrologers.] The name of the planet, which is imagined to be the giver or disposer of life in a nativity. *DiB.*

APHETERIA, in the ancient military art, a kind of engines used in the besieging of towns. Suidas does not mention their particular form or structure. Aquinas takes them to have been of the projectile kind.

* **APHETICAL.** *adj.* [from *apheta*.] Relating to the apheta.

APHGASI, a tribe of Tartars, who reside near the Caspian sea, W. of the Wolga.

(1.) * **APHILANTHROPY.** *n. f.* [*α* without and *φίλανθρωπία*, love of mankind.] Want of love to mankind.

(2.) **APHILANTHROPY**, [from *α*, *φίλος*, friend and *άνθρωπος*, man,] among physicians, denotes the state or disorder, wherein a person has an unnatural disrelish for mirth and society, and indulges in solitude and melancholy.

APHIOCEM, a composition made principally of the buds of hemp before they flower. It is much in use among the Arabs, and has the intoxicating quality of opium.

APHIOM, } **KARAHISSART**, a town of N
APHIOU, or } tolia, in Asiatic Turkey; so
APHIUM, } med, because it produces
gr

great deal of opium, called *aphion* by the Turks. It was formerly the patrimony of Othman, the Emperor of the Turkish monarchy, Long. 32. 18. E. lat. 38. 35. N.

APHIS, in zoology, the **PUCERON**, **VINE-DITTER**, or **PLANT-LOUSE**; a genus of insects belonging to the order of insects hemiptera.—The rostrum or beak of the aphid is inflected; the antennae or feelers are longer than the thorax; the wings are 4, and erect, or they are wanting; the feet are of the ambulatory kind; and the belly extends in two horns, from which is ejected the most delicate juice called **HONEYDEW**; which Linnæus enumerates 33 species of the aphid, 26 of them inhabitants of particular plants, from which their trivial names are taken; as, **APHIS ROSÆ**, **ULMI**, &c.: And he adds, that there seem to be a greater variety of plants producing aphides than there are different sorts of this insect. But some late observers have been able to distinguish more than double the above number of species; and it is probable that many more remain still to be added, as many of the same kind of plants are found to support two or three quite different sorts of aphides. Thus the plum-tree has two sorts very distinct from each other: one of a yellowish green, with a round short body; the other of a bluish green, as it were enameled with white, and the shape more oblong. On the gooseberry-bush and currant the same aphides may be found; but each of these is inhabited by two very different species: one being of a dusky green with a short plump body; the other of a paler green, the body more taper, and transversely wrinkled. The rose tree, again, supports not less than three distinct species: the largest is of a deep red, having long legs of a brownish cast, with the joints of a very dark brown, as are also the wings and antennae; a 2nd sort is of a paler green, has much shorter legs, and a more flat body; the 3rd sort is of a pale red, its body transversely wrinkled, and is most frequently on the sweet-brier.

APHIS, **EXTRAORDINARY GENERATION OF THE**. The extraordinary nature of these insects has for some time past justly excited the wonder and attention of naturalists. They were long ranked among the animals which had been denied with the true androgynes spoken of by Mr. Boyle; for having never been caught copulating, it was hastily concluded that they multiplied without copulation. This, however, was but a surmise, or at best a mere surmise: but this surmise was believed and adopted by Mr. Reaumur; and though he supported it by some observations peculiar to himself, the question remained still undecided, till Mr. Bonnet seemed to have cleared it up in the affirmative, by taking and shutting up a young aphid at the instant of its birth, in the most perfect solitude, which yet brought forth in 95 young ones. The same experiment being made on one of the individuals of this family that had been tried with its chief, the new brood soon multiplied like its parent; and one of the third generation, in like manner brought up in solitude, proved no less fruitful than the former. Repeated experiments, in this respect, as far as the fifth or sixth generation, all uniformly present

ing the observer with *secund virgins*, were communicated to the Royal Academy of Sciences; when an unforeseen and very strange suspicion, imparted by Mr. Trembley to Mr. Bonnet, engaged him anew in a series of still more painful experiments than the foregoing. In a letter which that celebrated observer wrote to him from the Hague, the 27th January 1741, he thus expresses himself: "I formed, since the month of November, the design of rearing several generations of solitary pucerons, in order to see if they would all equally bring forth young. In cases so remote from usual circumstances, it is allowed to try all sorts of means; and I argued with myself, Who knows? but that one copulation might serve for several generations? This *quæstio knovis*," to be sure, was next to avouching nothing; but as it came from Mr. Trembley, it was sufficient to persuade Mr. Bonnet that he had not gone far enough in his investigation. If the fecundity of aphides was owing to the secret copulation suggested by Mr. Trembley; this copulation served at least five or more successive generations. Mr. Bonnet therefore reared to the amount of the tenth generation of solitary aphides, and had the patience to keep an account of the days and hours of the births of each generation. In short, it was discovered, That they are really distinguished by sexes: That there are males and females amongst them, whose amours are the least equivocal of any in the world: that the males are produced only in the tenth generation, and are but few in number: that these soon arriving at their full growth, copulate with the females: that the virtue of this copulation serves for ten generations: that all these generations, except the first, (from the fecundated eggs) are produced viviparous; and all the individuals are females, except those of the last generations, among whom, as we have already observed, some males make their appearance, to lay the foundations of a fresh series.—These circumstances have been confirmed by other naturalists. In particular, we have a curious and accurate detail of them by Dr. Richardson of Rippon, in the Philosophical Transactions, Vol. xi. art. 22. an extract of which we shall here insert, in order to give the reader as full an insight into the nature of these singular insects, as can be done by a mere detail of facts in themselves utterly unaccountable.

(3.) APHIS, FARTHER ACCOUNT OF THE. "The great variety of species which occur in the insects now under consideration, may make an inquiry into their particular nature seem not a little perplexed; having them, however, skilfully reduced under their proper genus, the difficulty is by this means considerably diminished. All the insects comprehended under any distinct genus, we may reasonably suppose to partake of one general nature; and, by diligently examining any of the particular species, may thence gain some insight into the nature of all the rest. With this view I have chosen, out of the various sorts of aphides, the largest of those found on the rose tree; not only as its size makes it the more conspicuous, but as there are few others of so long duration. This sort, appearing early in the spring, continues late in the autumn; while several are limited to a much shorter term, in conformity to the different trees

and plants from whence they draw their nourishment. I. If at the beginning of February the weather happens to be so warm as to make the buds of the rose tree swell and appear green; small aphides are frequently to be found upon them, not larger than the young ones in summer when first produced. But there being no old ones to be found at this time of the year, which in summer I had observed to be viviparous, I was formerly not a little perplexed by such appearances, and almost induced to give credit to the old doctrine of equivocal generation. That the same kind of animal should at one time of the year be viviparous, and at another time oviparous, was an opinion I could then by no means entertain. This, however, frequent observation has at last convinced me to be fact; having found those aphides which appear early in the spring, to proceed from small black oval eggs which were deposited on the last year's shoots in autumn: though, when it happens that the insects make too early an appearance, I have observed the greatest part to suffer from the sharp weather that usually succeeds, by which means the rose trees are some years in a manner freed from them. Those which withstand the severity of the weather seldom come to their full growth before the month of April; at which time they usually begin to breed, after twice casting off their exuviae or outward covering. It appears then that they are all females, which produce each of them a very numerous progeny, and that without having intercourse with any male insect. As I observed before, they are viviparous; and what is equally uncommon, the young ones all come into the world backwards. When they first come from the parent, they are enveloped by a thin membrane, having in this situation the appearance of an oval egg; which, I apprehend, must have induced Reaumur to suspect that the eggs discovered by Bonnet were nothing more than mere abortions. These egg-like appearances adhere by one extremity to the mother; while the young ones contained in them extend the other; by that means gradually drawing the ruptured membrane over the head and body to the hind feet. During this operation, and for some time after, by means of something glutinous, the fore part of the head adheres to the vent of the parent. Being thus suspended in the air, it soon frees itself from the membrane in which it was confined, and, after its limbs are a little strengthened, is set down on some tender shoot, and then left to provide for itself."

(4.) APHIS, OTHER PHÆNOMENA RESPECTING THE. "II. In the spring months, there appear on the rose trees but two generations of aphides, including those which immediately proceed from the last year's eggs; the warmth of the summer adds so much to their fertility, that no less than five generations succeed one another in the interval. One is produced in May, which casts off its covering; while the months of June and July each supply two more, which cast off their coverings three or four times, according to the different warmth of the season. This frequent change of the outward covering is the more extraordinary, as it is the ofteneft repeated when the insects come soonest to their growth; which I have some-

times observed to happen in ten days, when warmth and plenty of nourishment have mutual conspired. From which considerations I am thoroughly convinced that these various coverings are not connate with the insect; but that they are like the scarf-skin, successively produced. Even in the month of June, some of the third generation which were produced about the middle of May after casting off their last covering, discover for erect wings, much longer than their bodies: and the same is observable in all the succeeding generations, which are produced during the summer months; without, however, distinguishing any variety of sex, as is usual in several other kinds of insects. For some time before the aphides come to their full growth, it is easy to discover which of them will have wings, by a remarkable swelling of the breast, which, in the others, is hardly to be distinguished from the body. When the last covering is ejected, the wings, which were before folded up in a very narrow compass, gradually extend themselves in a most surprising manner, and their dimensions are at last very considerable. But these winged ones have the peculiarity, that the number of them does not seem so much to depend on their original structure, as on the quantity or quality of the nourishment with which they are supplied: it being frequently observed, that those on a succulent shoot have few or none wings among them, while others of the same generation, on a less tender branch, are most of them winged; as if only the first rudiments of wings were composed in the former, while nature thought proper to expand them in the latter, that they might be more at liberty to supply their wants. The increase of these insects in the summer time is so very great, that, by wounding and exhausting the tender shoots, they would frequently suppress all vegetation, had they not many enemies which restrain them. To enumerate the variety of other insects that in their worm and fly state are constantly destroying them, would exceed the bounds of the present design: there is one, however, so singular in the manner of executing its purpose, that I cannot pass by it without some further notice. This is a very fine black ichneumon fly, with a slender body and very long antennæ, which darts its pointed tail into the bodies of the aphides, at the same time depositing an egg in each. This egg produces a worm, which feeds upon the containing insect: it attains its full growth; when it is usually changed to that kind of fly from whence it came. This, however, it is sometimes prevented by another sort of small black fly, which wounds the worm through its pearl-like habitation; and by laying one of its eggs therein, instead of the former fly, produces its own likeness. I must, however, further observe, notwithstanding these insects have many enemies, they are not without friends if we may consider those as such who were very officious in their attendance, for the good thing they expect to reap thereby. The ant and the bee are both of this kind, collecting the honey which the aphides abound; but with this difference, that the ants are constant visitors, the bee only when flowers are scarce. To which let me also add, that the ants will suck in the delicious nectar

nectar while the aphides are in the act of discharging it from the anus; but the bees only collect it from the leaves on which this honey dew has fallen."

(c.) APHIS, SEXES, &c. OF THE, DESCRIBED.

"III. In the autumn I find three more generations of aphides to be produced; two of which take their appearance in the month of August, and the third usually appear before the middle of September. As the two first differ in no respect from those which we meet with in summer, it would be wasting time to dwell any longer upon them; but the third, differing greatly from all the rest, demands our giving it a more serious attention. Though all the aphides which have hitherto appeared were females, in this tenth generation are found several male insects; not that they are by any means so numerous as the females, being only produced by a small number of the former generation. To which I must further add, that I have observed those which produce males, previously to have produced a number of females; which in all respects resembling those already described, I shall decline taking into any further consideration. The females have at first altogether the same appearance with those of the former generations; but in a few days their colour changes from a green to a yellow, which is gradually converted into an orange colour before they come to their full growth. They differ likewise in another respect, at least from those which occur in summer, that all those yellow females are without wings. The male insects are, however, still more remarkable, their outward appearance readily distinguishing them from the females of this and of the other generations. When first produced, they are not of a green colour like the rest, but of a reddish brown; and have afterwards, when they begin to thicken about the breast, a dark line across the middle of the back. These male insects come to their full growth in about three weeks, and then cast off their last covering; the whole insect being after this operation, of a bright yellow colour, the wings only excepted. But after this they soon change to a darker yellow, and in a few hours to a very dark brown; if we except the body, which is something lighter coloured, and has a reddish cast. They are all of the winged sort; and the wings, which are white at first, soon become transparent, and at length appear like very fine black gauze. The males no sooner come to maturity than they copulate with the females; in which act they are readily discovered, as they remain in conjunction for a considerable time, and are not easily disturbed. The commerce between them continues the whole month of October, and may be observed at all times of the day, though I have found it most frequent about noon; especially when the weather is moderately warm, and the sun overcast. The females, in a day or two after their intercourse with the males, I have observed to lay their eggs; which they usually do near the buds; when they are left to their own choice. Where there are a number crowded together, they of course interfere with each other; in which case they will frequently deposit their eggs on other parts of the branches, or even on the spines with which they are

beset." These insects are found in great numbers not only on the stems and leaves, but even upon roots of many trees and plants. See PLATE XIII. FIG. 7. Those trees that are most loaded with the insects, as already observed, suffer greatly from them. The plant lice thrust their sharp pointed rostrum into the substance of the leaf to draw out their sustenance, which warps the stems and leaves, and occasions in the latter cavities underneath, and swellings above; nay, even in some, a kind of hollow gall filled with insects, as is often seen on elm leaves. It appears astonishing that the slight puncture of so small an animal should so greatly disfigure a plant: but it must be remembered, that plant lice always live in numerous associations, which increase visibly by the prodigious fruitfulness of those insects; so that although each puncture be slight, yet the number of them is so great, so reiterated, that it is no longer a wonder the leaves should be disfigured. Lovers of gardening and plants are extremely anxious to free and cleanse their trees from these vermin; but their care often proves unavailing, the insects are so fruitful that they soon produce a fresh colony. The best and surest method of extirpating them, is to put on the trees infested with them some larvæ of the plant louse lion, or aphidivorous flies. (See COCCINELLA, ICHNEUMON, HEMEROBUS, &c.) For those voracious larvæ destroy every day a great number of these insects, and that with so much the more facility, as the latter remain quiet and motionless in the neighbourhood of these dangerous enemies, who range over heaps of plant lice which they gradually diminish and extirpate.

APHONIA, among physicians, signifies a suppression or total loss of voice. It is never a primary disease; but a consequence of many different disorders. The cure is to be effected by removing the disorder from whence the aphonia proceeds.

* APHONY. *n. f.* [α, without, and φων, speech.] A loss of speech. *Quincy.*

(1.) * APHORISM. *n. f.* [αφορισμός.] A maxim; a precept contracted in a short sentence; an unconnected position.—He will easily discern how little of truth there is in the multitude; and though sometimes they are flattered with that *aphorism*, will hardly believe the voice of the people to be the voice of God. *Brown's Vulgar Errors.*—I shall at present consider the *aphorism*, that a man of religion and virtue is a more useful, and consequently a more valuable member of a community. *Rogers.*

(2.) APHORISM is chiefly used in medicine and law. We say, the aphorisms of Hippocrates, of Sanctorius, of Boerhaave, aphorisms of the civil law, &c. It is sometimes used in divinity too.—We have seen a work entitled *Aphorisms of Faith.*

* APHORISTICAL. *adj.* [from *aphorism*.] In the form of an aphorism; in separate and unconnected sentences.

* APHORISTICALLY. *adv.* [from *aphoristical*.] In the form of an aphorism.—These being carried down, seldom miss a cure, as Hippocrates doth always *aphoristically* tell us. *Harvey.*

APHLASTUM, [from α and φλας, frangible,] in the ancient navigation, a wooden instrument, shaped like a plume of feathers, fastened on the goose's or swan's neck used by the ancient Greeks

[17. - APHRODISIAEA.] Venus.] Relating to the venereal disease.

APHRODISIAEA. We have often had occasion to remark Dr Johnson's deficiencies, but the above definition, (p. 17) is positively erroneous. Aphrodisiaea, in pharmacy, comprehend only that class of medicines, which tend to increase the feed, and consequently to give vigour, and an inclination to venery, to persons of cold, or exhausted constitution; whether owing to age, excessive indulgence, or natural impotence. We do not recollect any medical author who uses the word in the sense above stated by the doctor. Some indeed have applied the word *APHRODISIA*, we know not for what reason, to the epilepsy.

APHRODISIAEA, in the writings of the ancients, denoted a town, supposed, according to the idle traditions of those times, to have a power of procuring love to the person who were it about him, all the description we have of it is, that it was of a pale fish colour; but the stone, as well as its virtues, are now wholly unknown.

APHRODISIAEA, a town of Tunis.

APHRODISIUS, in chronology, denotes the eleventh month in the Babylonian year, commencing on the 23^d of June in ours.

APHRODITA, in zoology, an insect of the order of vermes multica. The body of the aphrodita is oval, with many small tentacula or protuberances on each side, which serve as so many

mach.

APHRODITRUM, in the ancient physics, notes the froth of nitrum. In which *aphroditrum* seems to amount to the same with *nitrum*. Hoffman affirms, that the nitrum and *aphroditrum* only differ in name. It appears, however, that there was a great difference between the two; *aphroditrum* resembling meal, or farina, and *nitrum* of a kind of intermediate virtue between *aphroditrum* and salt.

APHRODITRE, from *afros*, and *nitron*, a kind of nitre, recommended by the ancients, for the top. Some modern naturalists rather than the ancient *aphroditre* to have been a native salt, now called salt-petre of the rock. Greek and Latin expressed two different substances by the same *aphroditron*; the one, the native nitre of the ages; and the other the spume of the ocean, which they purified their nitre. Galen phrased it, that there were two different substances.

APHROSELENOB, among ancient writers, a denomination given to the *filantes*, or *lepra* *salutaria*.

APHYLLAE, in medicine, small, round, and perfect ulcers arising in the mouth. See *lepra* *salutaria*.

APHTHARTOCETAE, [from *aphthartocet*, corruptible, and *taurus*, to imagine, a kind of bull equies to the council] of Chalcedon. The

plunder thereof, according to Pliny, he founded the Capitol of Rome.

APION, a famous grammarian, born in Egypt, was a professor at Rome in the reign of Tiberius. He had all the arrogance of a mere pedant, and amused himself with inquiries, difficult in their investigation, and insignificant in their consequences. One of his principal works was his *Antiquities of Egypt*.

APIOS, in botany, a name given by many authors to those species of the *tithymal*, or spurge, which have tuberosc or knobby roots. Apios is also the name given by Boerhaave to some of the leguminous plants, comprised by Linnæus under the name *GLYCINE*.

(I.) APIS, in astronomy, the BEE, a southern constellation, called also *MUSCA*.

(II.) APIS, in fabulous history, the son of Jupiter and Niobe, and king of the Argives. Leaving that kingdom to his brother, he travelled into Egypt, where he taught the inhabitants agriculture, the planting of vineyards and other useful arts, whereupon they made him their king while he lived, and their god when he died. See N° III. § 1—5.

(III. 1.) APIS, in mythology, a divinity worshipped by the ancient Egyptians at Memphis. It was a living ox, having certain exterior marks; in which animal the soul of the great Osiris was supposed to subsist! This animal had the preference to all others, as being the symbol of agriculture, the improvement of which that prince had so much at heart.

(2.) APIS, BIRTH AND MARKS OF. According to several learned writers on the Egyptian religion, Apis was only a symbolical deity. "Amongst the animals consecrated to ancient rites, says Ammianus Marcellinus, Menvis and Apis are the most celebrated: the first is an emblem of the sun, the second of the moon." Porphyry tells us, that Apis bore the characteristic signs of the two stars; and Macrobius, who confirms this opinion, adds, that he was equally consecrated to them both. This bull, the object of public adoration, it may be supposed, could not be born like other animals. Accordingly, the priests published, that his origin was celestial. "An Apis is seldom born," says Pomponius Mela. "He is not produced by the ordinary laws of generation. The Egyptians say he owes his birth to celestial fire." Plutarch explains this passage; "The priests pretend, that the moon diffuses a generative influence, and as soon as a cow who takes the bull, is struck by it, she conceives an Apis. Accordingly, we discover in him the signs of that star."—Such were the fables industriously spread by those who presided over these pretended *divine* institutions. The ignorant people, to whom this emblematical deity presaged abundance, received them eagerly, and implicitly believed them. Pliny has described the characters which distinguished this sacred bull: "A white spot, resembling a crescent, on the right side, and a lump under the tongue, were the distinguishing marks of Apis." When a cow, therefore, which was thought to be struck with the rays of the moon, produced a calf, the sacred guides went to examine it, and if they found it conformable to this description,

they announced to the people the birth of Apis and fecundity.

(3.) APIS, INAUGURATION, PALACE, &c. OF. Ælian informs us, that as soon as a calf of the above description was produced, "the Egyptians immediately built a temple to the new god, facing the rising sun, according to the precepts of Mercury, where they nourished him with milk for four months. This term expired, the priests repaired in pomp to his habitation, and saluted him by the name of Apis. They then placed him in a vessel magnificently decorated, covered with rich tapestry, and resplendent with gold, and conducted him to Nilopolis, singing hymns, and burning perfumes. There they kept him for 40 days. During this space of time, women alone had permission to see him, and saluted him in a particular manner. After the inauguration of the god in this city, he was conveyed to Memphis with the same retinue, followed by an innumerable quantity of boats, sumptuously decked out. There they completed the ceremonies of his inauguration, and he became sacred to all the world. Apis was superbly lodged; and the place where he was mystically called *the bed*. Strabo having visited his palace, thus describes it: "The edifice where Apis is kept, is situated near the temple of Vulcan. He is fed in a sacred apartment, before which is a large court. The house in which they keep the cow that produced him, occupies one of its sides. Sometimes, to satisfy the curiosity of strangers, they make him go out into this court. One may see him at all times through a window, but the priests produce him to public view." "Once a year," says Solinus, "they present a heifer to him, and the same day they kill her." A bull, born in so marvellous a manner, must be possessed of supernatural knowledge. Accordingly, the priests published, that he predicted future events, by gestures, by motions, and other ways, which they construed according to the fancy. "Apis," says Pliny, "has two temples called *Beds*, which serve as an augury for the people. When they come to consult him, if he enters into a particular one, it is a favourable presage, and fatal if he passes into the other. He gives answers to individuals, by taking food from their hands. He refused that offered him by Germanicus, who died soon after." It would be unjust to conclude, that this respectable writer gave credit to such auguries. He relates the opinions of the Egyptians, and contents himself with stating facts without offering his judgment. Such was the installation of Apis. His anniversary was always celebrated for seven days. The people assembled to offer sacrifices to him, and what is extraordinary, oxen were immolated on the occasion. This solemnity did not pass without prodigies. Ammianus Marcellinus, who has collected the testimonies of the ancients, relates them in these words: "During the seven days, in which the priests of Memphis celebrate the birth of Apis, the crocodiles forget their natural ferocity, become gentle, and do no harm to any body!"

(4.) APIS, LIFE, AND DEATH OF, &c. The bull, Apis, however much honoured in his life, was not permitted to exceed a mysterious term fixed for his death. "Apis," says Pliny, "is

not live beyond a certain number of years. When he has attained that period, they drown him in the fountain of the priests; for it is not permitted, adds Ammianus Marcellinus, to let him prolong his life beyond the period prescribed for him by the sacred books." When this event happened, he was embalmed, and privately let down into the subterraneous places destined for that purpose. In this circumstance, the priests announced that Apis had disappeared; but when he died a natural death, before this period arrived, they claimed his death, and solemnly conveyed his body to the temple of Serapis. At Memphis was an ancient temple of Serapis, which strangers were forbidden to approach, and where the priests themselves only entered when Apis was interred. It was then, (says Plutarch) that they opened the gates called *Lethes* and *Cocytus*, (of oblivion and lamentation,) which made a harsh and piercing sound." Ammianus Marcellinus, and Solinus, paint with great energy the general despair of the Egyptians, who with cries and lamentations, demanded another Apis from heaven.

(I.) APIS, SYMBOLICAL MEANING OF. According to Plutarch, the term prescribed for the life of Apis, was 25 years; which number marked a period of the sun, and of the moon, and the bull was consecrated to these two bodies. Syncellus, in his *Chronography*, when he comes down to the 32d Pharaoh, called *Aseth*, says, "Before Aseth, the solar year consisted of 360 days. This prince added five to complete its course. In his reign, a calf was placed amongst the gods, and named *Apis*." And in the *Bibliotheca* of Fabricius, we have the following passage: "It was customary to inaugurate the kings of Egypt at Memphis, in the temple of Apis. They were here first initiated in the mysteries, and were solemnly invested; after which, they were permitted to bear the yoke of God, through a town in a place called the *Sanctuary*, the entrance of which was prohibited to the profane. There they were obliged to swear that they would neither insert months nor days in the year, and that it should remain composed of 365 days, as had been established by the ancients." From these facts, Mr Savary, in his letters on Egypt, infers, that Apis was the tutelary divinity of the new year given to the solar year, and of the cycle of 25 years, discovered at the same time. This deity, besides, had a marked relation to the swelling of the Nile, as is testified by a great number of historians. The new moon which followed the winter solstice, was the æra of this phenomenon, to which the eyes of every body were fixed: And Pausanias speaks as follows on this subject: "Apis had on his right side a white mark, representing the crescent; this mark (continues Ælian) indicated the commencement of the inundation." If Apis possessed the characteristic signs which proclaimed his divine origin, he promised fertility and abundance of the fruits of the earth. It seems demonstrated, therefore, Mr Savary adds, that this sacred bull, the guardian of the solar year of 365 days, was also regarded as the genius who presided over the overflowing of the river. The priests, by fixing the course of his life to 25 years, and by making the installation of a new Apis,

concur with the renewal of the period above mentioned, had probably perceived, as the result of long meteorological observations, that this revolution always brought about abundant seasons.—Nothing was better calculated to procure a favourable reception of this emblematical deity from the people, since his birth was a presage to them of a happy inundation, and of all the treasures of teeming nature. The solemnity of his inauguration was called *Apparition*. That which was renewed every year towards the 12th or 13th of the month *Payn*, which corresponds with the 17th or 18th of June, was called *the birth of Apis*. It was a time of rejoicing, which Ælian describes in the following manner: "What festivals! what sacrifices take place in Egypt, at the commencement of the inundation! It is then that all the people celebrate the birth of Apis. It would be tedious to describe the dances, the rejoicings, the shews, the banquets, to which the Egyptians abandon themselves on this occasion, and impossible to express the intoxication of joy which breaks forth in all the towns of the kingdom." These observations, Mr Savary thinks further confirmed by the name of this respectable bull; *Api*, in the Egyptian tongue, signifying number, measure.—This epithet perfectly characterizes an animal, established as the guardian of the solar year, the type of the cycle of 25 years, and the presage of a favourable inundation. Monsieur Huet, bishop of Avranches, has endeavoured to prove that Apis was a symbolical image of the patriarch, Joseph! and has supported his opinion with all his erudition. Dr Bryant apprehends that the name of *Apis* was an Egyptian term for a father; that it referred to the patriarch Noah; and that the crescent which was usually marked on the side of the animal, was a representation of the ark.

(IV.) APIS, THE BEE, in zoology, a genus of insects belonging to the order of insecta hymenoptera. The mouth is furnished with two jaws, and a proboscis infolded in a double sheath; the wings are four in number, the two foremost covering those behind when at rest: In the anus or tail of the female and working bees, there is a hidden sting. These insects are distinguished into several species, each of which has its peculiar genius, talent, manners, and disposition. Variety prevails in the order of their architecture, and in the nature of their materials. Some live in society, and share the toils; such are the common bee. Others dwell and work in solitude, building the cradles of their families; as the leaf cutter bee does with the rose tree leaf; the upholsterer with the gaudy tapestry of the corn rose; the mason bee with a plaster, the wood piercer with saw dust. All are employed in their little hermitage, with the care of providing for their offspring.—The species enumerated by Linnæus, are no fewer than 55; of which the following are the most remarkable:

(1.) APIS BRASILIANORUM, or pale red hairy bee, with the basis of the thighs black. This is a very large bee, every where covered with a testaceous skin. It is a native of America.

(2.) APIS CARIOSA is a yellowish hairy bee; and the feet and front are of a bright yellow colour. It builds in the rotten trees of Europe.

(3.) APIS

(3.) *APIS CENTUNCULARIS*, leaf cutter, or black bee, having its belly covered with yellow down. The nests of this species are made of leaves, curiously plaited in the form of a matt or quilt.—There are several varieties of the leaf cutting bees, all equally industrious. They dig into the ground, and build their nests, of which some have the form and size of thimbles inserted one within another, others the size and shape of goose quills. These nests are composed of pieces of leaves. Each sort of bees cut into its own materials; some the rose tree leaf, others the horse chestnut. A careful observer may discover rose tree leaves, cut as it were, with a pinking iron; and there he may procure himself the pleasure of seeing with what dexterity a bee, destitute of any mathematical instrument, cuts out a circular piece, fit to be either the bottom or the lid of one of those nests; others it cuts out into ovals and semi-ovals, which form the sides of the nests, into each of which it deposits one egg with ready prepared victuals.

4. *APIS DENTATA*, or shining green bee, with black wings, and a kind of teeth on the hind thighs. The tongue of this bee is as long as its body.

5. *APIS FERRUGINEA*, or smooth black bee, with the feelers, mouth, belly, and feet, of an iron colour. This is a small bee, and supposed to be of an intermediate kind between the bee and wasp. It is a native of Europe.

6. *APIS FLORISOMNIS*, or black bee with a cylindrical incurvated belly, having too tooth-like protuberances at the anus, and a kind of prickles on the hind legs. This bee sleeps in flowers; whence the name.

7. *APIS LAPIDARIA*, or red hairy bee, with a yellow anus, builds in holes of rocks.

8. *APIS MELLIFICA*, or domestic honey-bee. But the particulars concerning this valuable species are so numerous and interesting as to require a separate article for their detail; which the reader will therefore find at due length under the English name, BEE.

9. *APIS MUSCORUM*, or yellow hairy bee with a white belly, builds in mossy grounds. The skill displayed by these builders is admirable. In order to enjoy the pleasure of seeing their operations, let a nest be taken to pieces, and the moss conveyed to a distance. The bees will be seen to form themselves into a chain, from their nest to the place where the moss has been laid. The foremost lays hold of some with her teeth, clears it bit by bit with her feet (which circumstance has also procured them the name of *carding bees*;) then, by the help of her feet, she drives the unravelled moss under her belly; the second, in like manner, pushes it on to the third. Thus there is formed an uninterrupted chain of moss, which is wrought and interwoven with the greatest dexterity by those that abide by the nest; and that their nest may not be the sport of the winds, and may shelter them from rain, they throw an arch over it, which they compose with a kind of wax, tentaceous, though thin in substance, which is neither the unwrought bees wax nor the real wax. Dissolved in oil of turpentine, it may be used in taking off impressions.

APIS ROSTRATA is distinguished by the up-

per lip being inflected and of a conical shape, and by the belly being invested with bluish belts. They build their nests in high sandy grounds, and there is but one young in each nest.

11. *APIS TERRESTRIS* is black and hairy, with a white belt round the breast, and a white anus. It builds its nest very deep in the earth.

12. *APIS VARIEGATA*: The breast and belly are variegated with white and black spots; the legs are of an iron colour. It is a native of Europe. This species sleeps in the geranium phæum, or spotted crane's bill.

13. *APIS VIOLACEA* is a red bee, and very hairy with bluish wings. It is a native of Europe. The violacea is said to perforate trees, and hollow them out in a longitudinal direction; they begin to build their cells at the bottom of these holes, and deposit an egg in each cell, which is composed of the farina of plants, and honey or a kind of ignited

* *APISH*, *adj.* [from *ape*.] 1. Having the qualities of an ape; imitative.—

Report of fashions in proud Italy,
Whose manners still are tardy, *apish* nation
Limps after, in base awkward imitation.

Shakspeare

2. Foppish; affected.—

Because I cannot flatter, and look fair,

Duck with French nods and *apish* courtesy,

I must be held a rancorous enemy. *Shakspeare*

3. Silly; trifling; insignificant.—All this is but *apish* sophistry; and, to give it a name divine and excellent, is abusive and unjust. *Glanville*.

4. Wanton; playful.—

Gloomy fits the queen;

Till happy chance reverts the cruel scene;

And *apish* folly, with her wild resort

Of wit and jest, disturbs the solemn court.

Prior

* *APISHLY*, *adv.* [from *apish*.] In an *apish* manner; foppishly; conceitedly.

* *APISHNESS*, *n. s.* [from *apish*.] Mimicry; foppery; insignificance; playfulness.

APITCOMB, a small town in Somersetshire near Castle-Carey.

APITES, *APITIS VINUM*, [from *apit*, the pear tree,] perry, wine of pears. It is thus prepared by some: Cut and pound the pears, and having pressed out the juice, to every 12 pints thereof add one pint of honey, and let it ferment.

* *APITPAT*, *adv.* [a word formed from the motion.] With quick palpitatio.—O there he comes—Welcome my bully, my buck: agad, my heart has gone *apitpat* for you. *Congreve*,

(1.) *APIUM*, *PARSLEY*: A genus of the digynia order, belonging to the pentandria class of plants, and in the natural method ranking under the 4th order, *Umbellatæ*. The fruit is of an oval shape and streaked; the involucre consists of one leaf, and the petals are inflected. There are only two species, the culture of which are well known, viz.

1. *APIUM GRAVEOLENS*, or snallage, a native of Britain; and

2. *APIUM PETROSELINUM*, or common parsley, a native of Sardinia.

(II.) *APIUM*, *MEDICINAL USES OF*, &c. The roots and seeds of the *petroselinum* are used in medicine. The root of parsley is one of the five aperient roots, and in this intention is sometimes made an ingredient.

are an instruction to the bishops of the seven churches of Asia Minor. The fifteen following chapters contain the persecutions which the church was to suffer from the Jews, heretics, and Roman emperors. Next, St John prophesies of the vengeance of God, which he will exercise against those persecutors, against the Roman empire, and the city of Rome; which, as the Protestants suppose, he describes, under the name of Babylon, the great whore, seated upon seven hills. In the last place, the 19th, 20th, 21st, and 22d chapters, describe the triumph of the church over its enemies, the marriage of the Lamb, and the happiness of the church triumphant. "It is a part of this prophecy, (says Sir Isaac Newton,) that it should not be understood before the last age of the world; and therefore it makes for the credit of the prophecy, that it is not yet understood. The folly of interpreters has been to foretel times and things by this prophecy, as if God designed to make them prophets. By this rashness they have not only exposed themselves, but brought the prophecy also into contempt. The design of God was much otherwise: He gave this and the prophecies of the Old Testament, not to gratify men's curiosities, by enabling them to foreknow things: but that, after they were fulfilled, they might be interpreted by the events; and his own providence, not the interpreter's wisdom, be then manifested thereby to the world. And there is already so much of the prophecy fulfilled, that as many as will take pains in this study may see sufficient instances of God's providence."

(3.) **APOCALYPSES, VARIOUS.** There have been several other works published under the title of *Apocalypses*. Sozomen mentions, a book used in the churches of Palestine, called the *Apocalypse*, or *Revelation of St Peter*. He also mentions an *Apocalypse of St Paul*; which the Coptæ retain to this day. Eusebius also speaks of both these *Apocalypses*. St Epiphanius mentions an *Apocalypse of Adam*; Nicephorus, an *Apocalypse of Efdras*; Gratian and Cedrenus, an *Apocalypse of Moses*, another of St Thomas, and another of St Stephen; St Jerom, an *Apocalypse of Elias*. Porphyry, in his life of Plotin, makes mention of the *Apocalypse or Revelations of Zoroaster*, Zosimian, Nicothæus, Allegenes, &c.

* **APOCALYPTICAL.** *adj.* [from *apocalypse*.] Concerning revelation; containing revelation.—If we could understand that scene, at the opening of this *apocalypitical* theatre, we should find it a representation of the majesty of our Saviour.—*Burnet's Theory of the Earth*.

* **APOCALYPTICALLY.** *adv.* [from *apocalypitical*.] In such a manner as to reveal something secret.

APOCARITES, [from *αποκατεχω*, I cut off,] in ecclesiastical history, denote those who asserted that the human soul is part of, or derived from, the substance of God. They are ranked as a branch of the Manicheans.

APOCARPASUM, in natural history, a name given by the ancient Greeks to a poisonous drug, called also sometimes simply *carpasum*. It was the exudation of a tree growing in the country of Abyssines, and was so like the finest myrrh, it was often mixed with it, and many lives

were lost by administering it as myrrh. The wood of the tree which produced it was also poisonous though in a less degree.

(1.) **APOCATASTASIS**, [from *αποκαταστημι*, restore,] denotes the entire restitution, or redemption of a thing. In this sense, we read of the apocatastasis of the world, or of all things.

(2.) **APOCATASTASIS**, in astronomy, the period of a planet, or the time wherein it returns to the same point of the zodiac from which it set out.

(3.) **APOCATASTASIS**, in medicine, the subsiding, or sinking of a thing; such as, of tumors, &c.

APOCATHARSIS, the same with **CATHARSIS**, or expurgation.

APOCHA, [from *αποχω* and *εχω*, I have,] in civil law, an acquittance, or receipt given by the creditor to his debtor for money paid: in which sense, the word stands contradistinguished from *antapoch*, which is given by the debtor to the creditor.

APOCHALISMA, } [from *αποχω* and *χολη*, I extract the juice,] in pharmacy, the inspissated juice of vegetables.

APOCLASM, in surgery, the breaking off any part of the body.

* **APOCOPE.** *n. f.* [from *αποκοπη*.] A figure in grammar, when the last letter or syllable of a word is taken away; as, *ingeni*, for *ingenii*; *apoplex*, for *apoplexy*.

APOCRISARIUS, or } [from *αποκρισις*, answer,] in antiquity, an officer appointed to deliver the messages, orders, and answers, of a prince or emperor. He was also the emperor's chancellor, and kept the seal. Zosimus defines *apocrisarius*, secretary for foreign affairs, being the same with what Vopiscus, in the life of Aurelian, calls *notarius secretorum*.

(2.) **APOCRISIARIUS**, in ecclesiastical affairs, was appropriated to the pope's deputy, who resided at Constantinople to receive the pope's orders, and the emperor's answer. St Gregory was apocrisarius of pope Pelagius, when he composed his morals on Job. The apocrisarius did the office of the modern *munditor*. Sometimes he held the rank of the pope's *legate*. The institution of this office seems to have been in the time of Constantine, or not long after, when the emperors began to become Christians, foreign churches had more occasion to promote their suits at court. We find the office established by law in the time of Justinian. It was ordered, that as no bishop was to be long absent from his church without special command from the emperor, if any one had occasion to negotiate any ecclesiastical cause at court, he should prefer his petition by the apocrisarius of his church. Almost every monastery had its apocrisarius likewise, whose business was not to reside in the royal city, as the former did, but to act as proctors for their monastery, or any member of it, when they had occasion to enter any appearance at law, before the bishop, under whose jurisdiction they were. The heresies of the Monothelites and the Iconoclasts, broke off the custom of having a papal apocrisarius at Constantinople.

APOCRISIA, in physic, the ejection of superfluous fluids out of the body.

APOCRISIS, [from *αποκρισις*, answer,] literally denotes an answer. Under this denomination were anciently included, not only the rescripts of the emperor,

are two varieties of this; one with a purple, and the other with a white flower. The roots creep very much, and by them only it is propagated; for it seldom produces any seeds either in the gardens where it is cultivated, or in those places where it grows naturally. Mr Miller tells us, that he had been assured by a very curious botanist, who resided many years at Venice, and constantly went to the spot several times in the season to procure the seeds, had any been produced, that he never could find any pods formed on the plants. The stalks rise about two feet high, and are garnished with smooth oval leaves placed opposite; the flowers grow at the top of the stalks, in small umbels, and make a very pretty appearance. The flowers appear in July and August. This species is hardy enough to live in England in the open air, provided it is planted in a warm situation and dry soil. The best time for removing and planting its roots is in spring, just before they begin to push out new stalks.

4. *APOCYNUM VILLOSUM*, a native of Vera Cruz. (See N° 1.) This and the two first species are propagated by seeds, but are so tender as to require being kept constantly in a stove.

(II.) *APOCYNUM*, USES OF THE. All the species of this plant abound with a milky juice, which flows out from any part of their stalks and leaves when they are broken: this is generally supposed to be hurtful if taken inwardly, but doth not blister the skin when applied to it, as the juice of spurge and other acrid plants do. The pods of all the sorts are filled with seeds, which are for the most part compressed and lie over one another *imbricatim*, like the tiles of a house; these have each a long plume of a cottony down fastened to their crowns, by which when the pods are ripe and open, the seeds are wafted by the wind to a considerable distance, so that the plants become very troublesome weeds. This down is in great esteem in France, for stuffing of easy chairs, making quilts, &c. for it is exceedingly light and elastic. It is called by the French *delavand*; and might probably become a vendible commodity in England, were people attentive to the collecting of it in Jamaica where the plants are found in plenty.

APODACRYTICA, [from *απο* and *δακρυ*, a tear,] in pharmacy, medicines proper to excite tears. Some also use the term for remedies proper to suppress tears.

APODECTÆ, [from *αποδεχομαι*, I receive,] in antiquity, a denomination given to ten general receivers, appointed by the Athenians, to receive the public revenues, taxes, debts, and the like. The *apodectæ* had also a power to decide controversies arising in relation to money and taxes, all but those of the most difficult nature and highest concern; which were reserved to the courts of judicature.

APODECTÆI, in the Athenian government, officers appointed to see that the measures of corn were just.

APODEMICA, [from *αποδημιω*, I travel,] the doctrine or science of travelling, either for knowledge or devotion. J. Meraker published an *Apodemica*, and Ranzovius a *Methodus apodemica*.

(1.) *APODES*, in a general sense, [from *α*, and

ποδες,] denotes things without feet. Zoologists apply the name to a fabulous sort of birds, said to be found in some of the islands of the new world, which being entirely without feet, support themselves on the branches of trees, by the crooked bills. The Germans and Dutch have a sort of their *apodes*, a sort of birds, somewhat like swallows, whose legs and feet are so very small that they seem rather formed for creeping than running.

(2.) *APODES*, in the Linnæan system, the name of the first order of fishes, or those which have no belly fins. See ZOOLOGY.

APODICTIC. See next article.

* *APODICTICAL*. *adj.* [from *αποδεικνυμι*, evidence; demonstration.] Demonstrative; evidence beyond contradiction.—Holding an *apodictic* knowledge, and an assured knowledge of it; verily to persuade their apprehensions otherwise, were to make an Euclid believe, that there were more than one centre in a circle. *Braun's Vulgar Errors*. We can say all at the number three; therefore the world is perfect. Tobit went, and his dog followed him; therefore there is a world in the moon, we have an argument as *apodictical*. *Glanville*.

(1.) *APODIOXIS*, in logic, [from *αποδιωκειν*, to exclude,] the rejection of such things as do not necessarily belong to the question to be considered.

(2.) *APODIOXIS*, in rhetoric, a figure whereby we either pass over a thing slightly, or refer treating of it to some other time or place. It is called by Latin writers, *rejection*; e. g. *Quid ego senatus defendam, judices? Equidem debeo, &c.*

(1.) * *APODIXIS*. *n. f.* [from *αποδεικνυμι*.] Demonstration. *DiG.*

(2.) *APODIXIS*, in rhetoric, an evident proof of a point. We have several books extant under the names of *apodixes*, and some by way of answer to these, under that of *antapodixes*.

(3.) *APODIXIS*, in writers of the middle ages, a receipt for money paid.

* *APODOSIS*, [from *αποδοσκειν*, I apply, in rhetoric,] makes the third part of a complete exordium, being properly the application, or restriction of the protasis. The *apodosis* is the same with what is otherwise called *anagoge*, and stands opposed to protasis; e. g. (*protasis*), all branches of history are necessary for a student; (*apodosis*), that without these, he can never make any considerable figure; (*apodosis*), but literary history is of a more special use, which recommends it. *Apodosis* is also used, in speaking of similes, for that part which makes the application of them.

APODYTERIUM, [from *αποδυω*, to undress,] in antiquity, an apartment at the entrance of baths wherein persons dressed and undressed.

* *APOGÆON*. *n. f.* [from *απο*, from, and *γαια*, the earth.] A point

* *APOGEE*. *n. f.* [from *απο*, from, and *γαια*, the earth.] A point in the heavens, in which the sun, or a planet, is at the greatest distance possible from the earth in its whole revolution. The ancient astronomers regarded the earth as the centre of the system, chiefly regarded the *apogæon* as the perigæon, which the moderns, making the sun the centre, change for the *aphelion* and *perihelion*. *Chambers*.

Thy fin is in his *apogæon* placed,

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11. *APOLLON*, in mythology, a pagan deity worshipped by the Greeks and Romans. Cicero mentions four of the names: the most ancient of whom was the son of Vulcan; the second a son of Carybas, and born in Crete; the third an Asiatic, called *Nomian*, from his being a great legislator; and the last, to whom the greatest honour is ascribed, the son of Jupiter and Leto.—*Apollon* had a variety of other names, either as

that mentioned has taken up their names.—*Apollon*. On the four *Apollons* mentioned by Cicero, it appears that the three last were Greek and the first an Egyptian; who, according to the tradition, was the son of Osiris and Isis, and called *Crotop*. Pausanias is of the same opinion as Herodotus, and ranks *Apollon* among the Egyptian divinities. The testimony of Diodorus does not

71

72

craftiness and subtilty of his disposition, was said to have sprung from Mercury, the god of theft and fraud. Philammon is one of the first, after Apollo, upon fabulous record, as a vocal performer; who accompanied himself with the sound of the lyre: his son was the celebrated Thamyrae. See **THAMYRAE**.

(4.) **APOLLO, WORSHIP OF.** Apollo was more generally revered in the Pagan world than any other deity; having, in almost every region of it, temples, oracles, and festivals, as innumerable as his attributes. The wolf and hawk were consecrated to him, as symbols of his piercing eyes; the crow and the raven, because these birds were supposed to have by instinct the faculty of prediction; the laurel, from a persuasion that those who slept with some branches of that tree under their heads received certain vapours, which enabled them to prophesy. The cock was consecrated to him, because by his crowing he announces the rising of the sun; and the grasshopper on account of his singing faculty, which was supposed to do honour to the god of music. Plato says that the grasshopper sings all summer without food, like those men who, dedicating themselves to the Muses, forget the common concerns of life. The swan was regarded by the ancients as a bird sacred to Apollo in two capacities; first, as being, like the crow and raven, gifted with the spirit of prediction; and, 2dly, for his extraordinary vocal powers. The sweetness of his song, especially at the approach of death, was not only extolled by all the poets of antiquity, but by historians, philosophers, and sages; and to call a great writer the *swan* of his age and nation, was a full acknowledgement of his superiority. See **ANAS**, N° 15 § 1. Thus Horace calls Pindar *the Theban swan*. Plutarch, who was himself a priest of Apollo, in his dialogue upon music, makes one of his interlocutors say, that an invention so useful and charming could never have been the work of man, but must have originated from some god, such as Apollo the inventor of the flute and lyre, improperly attributed to Hyagnis, Marfyas, Olympus, and others; and the proofs he urges in support of this assertion, show, if not its truth, at least that it was the common opinion. "All dances and sacrifices, says he, used in honour of Apollo, are performed to the sound of flutes: the statue of this god at Delos, erected in the time of Hercules, had in its right hand a bow; and on the left stood the three Graces, who were furnished with three kinds of instruments; the lyre, the flute, and the syrinx. The youth also, who carries the laurel of Tempe to Delphos, is accompanied by one playing on the flute; and the sacred presents formerly sent to Delos by the Hyperboreans, were conducted thither to the sound of lyres, flutes, and shepherds pipes." Callimachus wrote a hymn, in honour of Apollo, which was for many ages performed among the Greeks, at their religious festivals, with the most enthusiastic zeal. For a translation of it, See **Prior's poems**.

(II.) **APOLLO BELVIDERE**, one in the first class of the ancient statues. The excellence of this statue consists in the expression of something divine, whereas the rest excel only in things that are com-

mon to men. This statue may perhaps justly claim the preference, even in the superior and distinguished class of the best remains of all antiquity. There are about 20 ancient statues which the moderns have discovered that are referred to the first class, and considered each as the chief beauty in its kind.

(1.) **APOLLODORUS**, a celebrated grammarian of Athens, the son of Asclepiades and disciple of Aristarchus. He wrote many works now extant; but his most famous production was his *Bibliotheca*, concerning the origin of the gods. The work consisted of 24 books, but only three are now in being. Several other pieces of his age are to be found in Fabricius's *Bibliotheca Græca*.

(2.) **APOLLODORUS**, a famous painter of Athens, who about A. A. C. 408, invented the art of mingling colours, and of expressing lights and shades. He was admired also for his judicious choice of subjects, and for the beauty and strength of colouring surpassed all the masters that were before him. He excelled likewise in statuary.

(3.) **APOLLODORUS**, a native of Damascus, an eminent architect under Trajan and Hadrian. He had the direction of the bridge of stone which Trajan ordered to be built over the Danube, A. D. 104, which was esteemed the most magnificent of all the works of that emperor. Adrian, one day, as Trajan was discoursing with this architect upon the buildings he had raised at Rome, gave his judgment, and showed he understood nothing of the matter. Apollodorus turned upon him bluntly, and said to him, Go paint citruls for you are very ignorant of the subject we are talking upon. Adrian at this time boasted of his painting citruls well. This insult cost Apollodorus his life, afterwards.

(1.) **APOLLONIA**, feasts sacred to Apollo, instituted upon the following occasion. Apollo, having vanquished Python, went with his sister Diana to Ægialea; but, being driven from thence, he removed to the island Crete. The Ægialeans were soon after visited with a plague; upon which consulting the soothsayers, they were ordered to send 7 young men and as many virgins, to appease these deities and bring them back into the country. Apollo and Diana being thus appeased, returned to Ægialea: in memory of which, they dedicated a temple to Pitho, the goddess of persuasion; whence a custom arose of choosing every year seven young men, and as many virgins, to go as it were in search of Apollo and Diana.

(2.) **APOLLONIA**, in geography, a promontory of Africa, upon the coast of Guinea, near the mouth of the river Mancu.

(3.) **APOLLONIA**, the name of a colony of the Milesians in Thrace, from which Lucullus took away a colossus of Apollo, and placed it in the capitol. The greatest part of the town was situated in a small island on the Euxine, in which was a temple of Apollo. Pliny says the colossus was 30 cubits high, and cost 500 talents.

(4—9.) **APOLLONIA**, the name of several other ancient towns, viz. 4. in Albania: 5. in Asia Minor, on the coast, supposed to be the Assos mentioned in the Acts of the Apostles: 6. in Bactria with a capacious harbour, called by the Arabs Bonandreaand, 7. in Macedonia, 8. at mount Parnassus.

massus, near Delphi, and 9. Troezen was formerly called *Apollonia*.

APOLLONIAN HYPERBOLA and parabola. See HYPERBOLA, &c.

(1.) APOLLONIUS, author of the *Argonautica*, surnamed THE RHODIAN, from the place of his residence, is supposed to have been a native of Alexandria, where he is said to have recited some portion of his poem while he was yet a youth. Finding it ill received by his countrymen, he retired to Rhodes; where he is conjectured to have polished and completed his work, supporting himself by the profession of rhetoric, and receiving from the Rhodians the freedom of their city. He at length returned, with considerable honour to the place of his birth; and succeeded Eratosthenes in the care of the Alexandrian library in the reign of Ptolemy Evergetes, about A. A. C. 246. That prince had been educated by the famous Aristarchus, and rivalled the preceding sovereigns of his royal family in the munificent encouragement of learning. Apollonius was a disciple of the poet Callimachus; but their connection ended in the most violent enmity, which was probably owing to some degree of contempt expressed by Apollonius for the light compositions of his master. The only work of Apollonius which has descended to modern times is his poem above mentioned, in four books, on the Argonautic expedition. Both Longinus and Quintilian have assigned to this work the mortifying character of mediocrity: "But (says Mr Hayley) there lies an appeal from the sentence of the most candid and enlightened critics to the voice of Nature; and the merit of Apollonius has little to apprehend from the decision of this ultimate judge. His poems abound in animated description, and in passages of the most tender and pathetic beauty. How finely painted is the first setting forth of the Argo! and how beautifully is the wife of Chiron introduced, holding up the little Achilles in her arms, and showing him to his father Peleus as he sailed along the shore! But the chief excellence in our poet, is the spirit and delicacy with which he has delineated the passion of love in his Medea. That Virgil thought very highly of his merit in this particular, is sufficiently evident from the minute exactness with which he has copied many tender touches of the Grecian poet. Those who compare the 3d book of Apollonius with the 4th of Virgil, may, I think, perceive not only that the latter has some features of Medea, but the two poets, however different in their reputation, resembled each other in their genius; and they both excel in delicacy and pathos."—The ancient scholia upon his *Argonautics*, still extant, are extremely useful, and full of learning.

(2.) APOLLONIUS of Perga, in Pamphylia, was a great geometrician, under Ptolemy Evergetes, from the 133d Olympiad to the 139th. He studied at Alexandria, under the disciples of Euclid; and composed several works, of which that only of the Conics remains.

(3.) APOLLONIUS, of Tyana in Cappadocia, a Pythagorean philosopher, who flourished about the beginning of the first century. At 16 years of age he became a strict observer of Pythagoras' rules, renouncing wine, women, and all sorts of

flesh; not wearing shoes, letting his hair grow, and wearing nothing but linen. He soon after set up for a reformer of mankind, and chose his habitation in a temple of Æsculapius, where he is said to have performed many wonderful cures. Philostratus has wrote the life of Apollonius, in which there are numberless fabulous stories recounted of him. We are told that he went five years without speaking; and yet, during this time, that he stopped many seditions in Cilicia and Pamphylia: that he travelled, and set up for a legislator; and that he gave out that he understood all languages, without having ever learned them: that he could tell the thoughts of men, and understood the oracles which birds gave by their singing. The Heathens were fond of opposing the pretended miracles of this man to those of our Saviour; and by a treatise which Eusebius wrote against one Hierocles, we find that the drift of the latter, in the treatise which Eusebius refutes, seems to have been to draw a parallel betwixt Jesus Christ and Apollonius, in which he gives the preference to this philosopher. Mr Dupin has wrote a confutation of Philostratus's life of Apollonius. Apollonius wrote some works; viz. four books of judicial astrology; a treatise upon the sacrifices, showing what was proper to be offered to each deity; and a great number of letters; all of which are now lost.

APOLLOS, in Scripture history, a Jew of Alexandria, who came to Ephesus, during the absence of St Paul, who was gone to Jerusalem (Acts xviii. 24.) Apollos was an eloquent man, well versed in the Scriptures; and spoke with zeal and fervour; but knowing nothing but the baptism of John, he was only a catechumen, or one of the lowest order of Christians, and did not as yet distinctly know the mysteries of the Christian doctrine. However, he knew that Jesus Christ was the Messiah, and declared himself openly to be his disciple. When therefore he was come to Ephesus, he began to speak boldly in the synagogue, and to show that Jesus was the Christ. Aquila and Priscilla having heard him, took him home with them; and instructed him more fully in the ways of God. Some time after this he had a mind to go into Achaia; and the brethren wrote to the disciples, desiring them to receive him. He arrived at Corinth; and was there very useful in convincing the Jews out of the Scriptures, that Jesus was the Messiah. Thus he watered what St Paul had planted in this city; but the great fondness which his disciples had for his person had almost produced a schism; some "saying, I am of Paul; others, I am of Apollos, I am of Cephas," &c. However, this division, which St Paul speaks of in the chapter last quoted, did not prevent that apostle and Apollos from being closely united by the bands of charity. Apollos hearing that the apostle was at Ephesus, went to meet him, and was there when St Paul wrote the epistle to the Corinthians; wherein he testifies, that he had earnestly entreated Apollos to return to Corinth, but hitherto had not been able to prevail with him; that, nevertheless, he gave him room to hope that he would go when he had an opportunity. St Jerom says, that Apollos was so dissatisfied with the division which had happened upon

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in architecture, that part of a column, where it begins to spring out of its base, and was originally no more than the ring or ferrel, which anciently bound the extremities of wooden pillars, to keep them from splitting, and were afterwards imitated in stone work. We sometimes call it the spring of the column. *Chambers*.

(1.) * APOPHYSIS, *n. f.* [*επιφυσις*.] The prominent parts of some bones, the same as process. It differs from an epiphysis, as it is a continuance of the bone itself; whereas the latter is somewhat adhering to a bone, and in which it is not properly a part. *Reyn.*—It is the *apophysis*, the head of the os tibiae, which makes the knee. *Reynold's Surgery*.

(2.) APOPHYSIS, in anatomy. See ANATOMY, INDEX.

(3.) APOPHYSIS, in botany, an excrescence from the receptacle of the nuclei.

APOPLANESIS, [*from ἀποπλάνω, I deceive.*] in oratory, a kind of fallacious defence, and turning over, darkening, and concealing things, in order to blind the judges, or the audience. It also implies that species of confusion, wherein the speaker pretends to answer what the adversary objects in another place, but which being too difficult to answer, is afterwards left to pass unanswered.

a sudden abolition of all the fibres, external, internal, of all voluntary motion, by the stop of the flux and reflux of the animal spirits, the nerves declined for those motions. *Arantius Divi*.—Peace is very *apoplexy*, lethargy, insensibility, deaf, sleepy, insensible. *Shadish. Corb.*—A fever may take away my reason, or passion, and an *apoplexy* leave neither sense nor understanding. *Locke*.

(2.) APOPLEXY. See MEDICINE, INDEX. APOPLISTÆ, [*from ἀπο, and πλίσσω, ancient laws*, a sort of officers in the country, pointed to disarm all private persons, or those entitled to have arms, for the prevention of chief and violence.

APOPOMPEÆ, in antiquity, certain days, which sacrifices were offered to the gods in Pampres. Who these deities were, is doubtful.

APOPHYCHIA, [*from ἀποφύχω, I expel*, understood of *ethera*, emitted from the moon, and other heavenly bodies, to which influence on sublunary things was ascribed by Astrologers.

APORE, [*απορος, Gr.*] doubting. See ANOMY. * APORIA, *n. f.* [*απορία*.] Is a figure of speech, by which the speaker shews, that he does not know where to begin for the multitude of matter, what to say in some first act and ambiguous in-

[illegible]

THIS *Great Boy*, "Neither he took them from his
glows nor impatience, gave them to a barlow
nor triflingly, revealed them from the Roman
page nor exactly, or selected them more pre-
sently, I cannot well declare. Smith's *Refractive*

APOMORPHE, [from *apomorphos*, difficult, unpre-
dictable, & *morphe*, a cable, a problem difficult to
solve, and which has never been resolved
though it be not, in itself, impossible. Such
is the quadrature of the circle; the duplicate
square; the trisection of an angle, &c. When
a question was proposed of the fact of *Academus*,
the philosopher, he said, "I cannot say, for I
could not give a solution, his answer was, 'a
man I cannot give through it.' This word is also
used by some law writers for an insuperable point
of law."

APORRHOE. See **APORRHOE**.

APORRHOEA, *an* [from *aporrhoea*, Effusion;
effusion, fracture, or injury by another not
to life.—The reason of this endeavour to make
it by a stomach operation, which passing from
the cruentate weapon to the wound, and being
incorporated with the particles of the fibre, carry
it to the affected part. *Cruentate's* *Sophy*.

APORRHOE, in astrology, is when the
astronomer from one planet and applies to
another.

APORRHOE, in physics, is used for morbid
or contagious *magination*, or *phloga* from unwhol-
some food. The word is also used to denote a
badly or falling off of the hair. See **ALOPICIA**.

APORRHOE, from *aporrhoea* to flow from, is
a disease of the skin, in which the pores of the
skin, and from the earth, and subterranean bodies.

APORRHOE, in ornithology, the eye (swallow).

APORRHOE, from *aporrhoea*, [from *aporrhoea*, and *aporrhoea*,
a laceration, a species of fracture of the skull or
the bone, wherein a piece is taken clearly off
and put on with a butcher.

APORRHOE, from *aporrhoea*, [from *aporrhoea*, from *aporrhoea*,
to come to, to be, to be, to be. A form of speech,
which the speaker, through loose attention, as
now, bathings, fear, anger, or whimsey, or
some of his speech before it be all ended.

APORRHOE, from *aporrhoea*, [from *aporrhoea*,
when, speaking of a thing, we yet seem
to conceal it, though indeed we aggravate it, or
omit it, or the sentence began it is, *Oratory*,
is a theory of the mind, which is a form of speech,
which, may be understood. *Smith's* *Rhetoric*.

APORRHOE, also called *aporrhoea*, and
aporrhoea, is commonly used to denote the
word *aporrhoea*. [See *Scaliger's* *Orthographia*.]

The latter, according to him, being only
the name of a word; the former, the milita-
ry to relate some part of the action. This di-
vision of use to keep up the fidelity of a dic-
tionary.

APORRHOE, [from *aporrhoea*, and *aporrhoea*, food, in
reference, as relation to food. It amounts to
such be true with *analogia*; though some
times it is different, alleging that the latter im-
plies a desire, or want of desire to eat;
the former an excess of desire.

APORRHOE, [from *aporrhoea*, I fear off, or
I am afraid, denote a situation of continuity in some
essential part, as a member, pigment, or the
essential part, as a member, pigment, or the

metals, as *crata melanotaria*, moly, &c., or the like.

APOSPHACELIS, or, from *apo* and *sphacelo*, from *scabellum*, to scab, in anatomy, the figure or impression of a seal. It was forbid among the ancients to bear the figure or image of food on their rings and seals. To this purpose the precept of Pythagoras, to abstain from flesh, appears to have in part arisen from this idea. It was usual to have the figures of Egyptian and other deities, as well as of heroes, monsters, friends, benefactors, and even brutes, on their *scabellæ*, or ring-fingers. Thus Cæsar had the image of Venus, Potho of Alexander, Augustus of the *prætor*, Pompey of a frog, Lentulus of a *phœnix*, &c.

APOSPONGIUM, from *apo* and *spongia*, an ancient phylax, the application of a sponge, whether dry or soaked with water, either to cleanse a part, or to ease pains, allay itching, or refresh the spirits.

APOSTA, a creature in America, so great a lover of men, that it follows them and delights to gaze on them. Sir Isidor, who gave the above best account of it, says, that he has seen it, whether it is a quadruped, a bird or a reptile.

APOSTASY. See **APOSTATE**, § 1, 2, and 3.

APOSTAGMA, from *apo*, and, *stigma*, a mark, in natural history, the juice which runs from the grapes before they are trodden or pressed. It is also called *stigmatica*.

APOSTATA is used, in law, with respect to transgress the law.

APOSTASIS, from *apo*, and, *stasis*, to depart, &c., in physics, the same with absciss. The word also denotes a removal of the morbid matter, in the crisis of a disease. It is likewise used by Hippocrates for a fracture of a bone, whereas some parts use it for a dislocation.

(1.) **APOSTASY**, a. s. [Excessive.] Departure from what a man has professed. It is generally applied to religion, sometimes with the particle *from*—The cynos law *drinks apostasy* to be a wiful departure from their flat of faith; which any person has professed himself to hold in the Christian religion. *Apostasy* is the word used in Adam, by the devil, to beware *Apostasy*, by what build a hea'n

To those apostates. Hilary.

Vice in us were not only weakened, but *apostasy* degenerate wickedness, *Spence*—Whoever do give their heart to wealths, must bring down to god's which will be *apostasy* from God. *Stillingfleet*.

(2.) **APOSTASY**, ANCIENT DISTINCTIONS.—The primitive Christian church distinguished several kinds of apostasy. The first, of those who were entirely from Christianity to Judaism, the second, of those who mingled Judaism and Christianity together; and the third, of those who were not so much from God, as to communicate with them, in many of their unlawful practices, without making a formal profession of their religion. But the fourth sort was of those, who,

after having been some time Christians, voluntarily relapsed into Paganism.

(3.) APOSTASY, LAWS AGAINST. The perversion of a Christian to Judaism, Paganism, or other false religion, was punished by the emperors Constantius and Julian with confiscation of goods; to which the emperors Theodosius and Valentinian added capital punishment, in case the apostate endeavoured to pervert others. A punishment too severe for any temporal laws to inflict; and yet the zeal of our ancestors imported it into this country; for we find by Bracton, that in his time apostates were to be burnt to death. Doubtless, the preservation of Christianity, as a national religion, is, abstracted from its own intrinsic truth, (and without entering upon the question respecting establishments of religion,) of the utmost consequence to the civil state; which a single instance will sufficiently demonstrate. The belief of a future state of rewards and punishments, the entertaining just ideas of the moral attributes of the Supreme Being, and a firm persuasion that he superintends, and will finally compensate every action in human life (all which are clearly revealed in the doctrines, and forcibly inculcated by the precepts, of our saviour Christ,) these are the grand foundation of all judicial oaths; which call God to witness the truth of those facts, which perhaps may be only known to him and the party attesting: all moral evidence, therefore, all confidence in human veracity, must be weakened by apostasy, and overthrown by total infidelity.—Wherefore all affronts on Christianity, or endeavours to depreciate its efficacy, in those who have once professed it, are highly deserving of censure. But yet the loss of life is a heavier penalty than the offence, taken in a civil light, deserves; and, taken in a spiritual light, our laws have no jurisdiction over it. This punishment, therefore, has long ago become obsolete; and the offence of apostasy was for a long time the object only of the ecclesiastical courts, which corrected the offender *pro salute animæ*. But about the close of the last century, the civil liberties, to which we were then restored, being used as a cloke of licentiousness, and doctrines, subversive of all religion, being publicly avowed, both in discourse and writings, it was thought necessary again, for the civil power to interpose, by not admitting those miscreants to the privileges of society, who maintained such principles as destroyed all moral obligation. To this end, it was enacted, by statute 9 and 10 W. III. c. 32. That if any person, educated in, or having made profession of, the Christian religion, shall, by writing, printing, teaching, or advised speaking, deny the Christian religion to be true, or the holy Scriptures to be of divine authority, he shall, upon the first offence, be rendered incapable to hold any office or place of trust; and, for the second, be rendered incapable of bringing any action, or of being guardian, executor, legatee, or purchaser of lands, and shall suffer three years imprisonment without bail. To give room, however, for repentance, if, within four months after the first conviction, the delinquent will, in open court, publicly renounce his error, he is discharged, for that once, from all disabilities.

APOSTATA CAPIENDO, in the English law, a writ that formerly lay against a person who, having entered into some order of religion, broke out again, and wandered up and down the country.

APOSTATARE LEGES. See APOSTARE LEGES.

(1.) * APOSTATE. *n. f.* [*apostata*, Lat. *ἀποστατης*.] One that has forsaken his profession; generally applied to one that has left his religion.—The angels, for disobedience, thou hast reserved to a miserable immortality; but unto man, equally rebellious, equally *apostate from thee and goodness*, thou hast given a Saviour. *Rogers's Sermon*.—*Apostates*, in point of faith, are, according to the civil law, subject unto all punishments ordained against hereticks. *Ayliffe*.

(2.) APOSTATE, among the Romanists, signifies a man, who, without a legal dispensation, forsakes a religious order, of which he had made profession.

* APOSTATICAL. *adj.* [from *apostate*.] After the manner of an apostate.—To wear turbans is an *apostatical* conformity. *Sandys*.

* To APOSTATIZE. *v. n.* [from *apostate*.] To forsake one's profession; it is commonly used of one who departs from his religion.—None revolt from the faith; because they must not look upon a woman to lust after her, but because they are restrained from the perpetration of their lusts. If wanton glances, and libidinous thoughts, had been permitted by the gospel, they would have *apostatized* nevertheless. *Bentley*.

APOSTEM, or } See APOSTEME, and APOSTEMA, } TUME.

* To APOSTEMATE. *v. n.* [from *apostema*.] To become an aposteme; to swell and corrupt into matter.—There is care to be taken in abcesses of the breast and belly, in danger of breaking inwards; yet, by opening these too soon, they sometimes *apostemate* again, and become crude. *Wifeman*.

* APOSTEMATION. *n. f.* [from *apostema*.] The formation of an aposteme; the gathering of a hollow purulent tumour.—Nothing can be more admirable, than the many ways nature hath provided for preventing, or curing of fevers; as, vomitings, *apostemations*, salivations, &c. *Grew*.

* APOSTEME, APOSTUME. *n. f.* [*ἀπώστημα*.] A hollow swelling, filled with purulent matter; an abscess.—With equal propriety we may affirm, that ulcers of the lungs, or *apostemes* of the brain, do happen only in the left side. *Brown's Vulgar Errors*.—The opening of *apostemes*, before the suppuration be perfected, weakeneth the heat, and renders them crude. *Wifeman*.

APOSTERIGMA, [from *ἀπο*, and *στηριγμα*, I support,] in the ancient physic, denotes a support for a diseased part, without binding.

A POSTERIORI, or demonstration *à posteriori*. See DEMONSTRATION.

APOSTIL, APOSTILLA, in literary matters, a marginal note to a book.

(1. 1.) * APOSTLE. *n. f.* [*apostolus*, Lat. *ἀπόστολος*.] A person sent with mandates by another. It is particularly applied to them, whom our Saviour deputed to preach the gospel.—

But

[REDACTED]

[REDACTED]

APOSTOLATE, in a general sense, is used for mission. In this sense, Olearius has a discourse

[illegible]

lence of Mörven He is fallen! Thy youth is low; pale beneath the sword of Cuchullin!"

* APOSTROPHIZE. *v. n.* [from *apostrophe*.] To address by an apostrophe.—There is a peculiarity in Homer's manner of *apostrophizing* Eumæus; and speaking of him in the second person, it is generally applied only to men of account. *P. pe.*

APOSTROPHUS. See APOSTROPHE, § 2.

* APOSTUME. *n. f.* See APOSTEME. [This word is properly *apostem*.] A hollow tumour filled with purulent matter.—How an *apostume* in the mesentery breaking, causes a consumption in the parts, is apparent. *Harvey.*

* To APOSTUME. *v. n.* [from *apostume*.] To apostemate. *Dist.*

APOSYRMA, [from *αποσύνωμι*, I take off,] in medicine, denotes a disquamation or scaling of the skin; in which sense, the word amounts to much the same with abrasion.

APOTACTICI, or } [formed from *αποτάττω*, to
APOTACTITÆ, } renounce,] an ancient sect, who, affecting to follow the evangelical counsels of poverty, and the examples of the apostles, and primitive Christians, renounced all their effects and possessions. It does not appear, that they fell into any errors during their first state; some ecclesiastical writers assure us, they had divers martyrs, under the persecution of Diocletian, in the 4th century; but they afterwards fell into the opinion of the Encratitæ, and taught, that the renouncing of all riches was not only a matter of advice, but of precept and necessity. And therefore the 6th law in the Theodosian Code joins the Apotactitæ with the Eunomians and Arians.

APOTEICHISMUS, [from *αποτειχίζω*, to raise a wall,] is the ancient military art, a line of circumvallation drawn round a place, to besiege it. It was the first operation the ancients performed, when they designed to lay close siege to a place. It sometimes consisted of a double wall, or rampart, raised of earth; the innermost to prevent sudden sallies from the town; the outermost to keep off foreign enemies from coming to the relief of the besieged. This answered to what we call lines of contravallation and circumvallation, among the moderns.

APOTELESMA, [from *αποτελέω*, to perform,] an effect of some cause; also a prognostic, or prediction of an event; in which sense, Scaliger speaks of the *apotelesmata* of Hippocrates. The answers of astrologers deduced from the considerations of the stars are particularly called *apotelesmata*; which were the expressions they used, to denote the effects of the stars and planets on sub-lunary bodies.

APOTELESMATICA, the art of foretelling future events, from the aspects of the heavenly bodies; in which sense, the word amounts to the same with judicial astrology.

APOTELESMATICAL ASTRONOMY, the same with astrology.

APOTELISMATICI, astrologers.

APOTELISM See APOTELESMA.

APOTHECARIUS, in writers of the middle age, denotes a shop keeper, or ware house keeper. Apothecarius is also used to denote a store keeper, or officer appointed to have the direction

of a magazine, granary, &c. In which sense, *apothecarii* is sometimes rendered by *borearii* and *rationarii*.

(1.) * APOTHECARY. *n. f.* [*apotheca*, Lat. repository.] A man whose employment is to keep medicines for sale.—Give me an ounce of civet good *apothecary*, to sweeten my imagination *Shakespeare's King Lear*.—They have no other doctor but the sun and the fresh air, and that such an one, as never sends them to the *apothecary* *South.*

Wand'ring in the dark,
Physicians, for the tree, have found the bark;
They, lab'ring for relief of human kind,
With sharpen'd sight some remedies may find
Th' *apothecary* train is wholly blind. *Dr. Keble*

(2.) APOTHECARY, [from *αποθήκη*, a shop,] may be also defined one who practises the art of pharmacy. In London, the apothecaries are one of the city companies. They were incorporated by a charter from king James I. procured at the solicitation of Dr Mayerne and Dr Aitkens: till that time they only made a part of the grocers company; plums, sugar, spice, Venice treacle, mithridate, &c. were sold in the same shop, and by the same person. The reason of separating them was, that medicines might be better prepared and in opposition to divers persons, who imposed unwholesome remedies on the people. By an act which was made perpetual in the 9th Geo. I. they are exempted from serving upon juries, or in ward and parish offices. They are obliged to make up their medicines according to the formulas prescribed in the college dispensatory; and are liable to have their shops visited by the censors of the college, who are empowered to destroy such medicines as they think not good. They have a hall in Black Friars, where there are two fine laboratories, out of which all the surgeons and apothecaries are supplied with medicines for the British army and navy. His majesty has two apothecaries, whose salaries are L. 320, and L. 275. To the household belong other two.

* APOTHEGM. *n. f.* [properly *ΑΠΟΡΗΤΗΓΜΑ*, which see.] A remarkable saying.—By frequently conversing with him, and scattering short *apothegms*, and little pleasant stories, and making useful applications of them, his son was, in his infancy, taught to abhor vanity and vice as monsters. *Walton's Life of Sanderson.*

* APOTHEOSIS. *n. f.* [*αποθεωσις*.] Deification, the rite of adding any one to the number of gods.—As if it could be graven and painted omnipotent, or the nails and the hammer could give it a *apotheosis*. *South.*

Allots the prince of his celestial line,
An *apotheosis*, and rites divine. *Garth*

(2.) APOTHEOSIS, CEREMONY AND CONSEQUENCES, &c. OF AN. Among the Romans, the ceremony of deifying their emperors, was, according to Herodian's description, as follows. After the body of the deceased had been buried with the usual solemnities, an image of wax, exactly resembling him, was placed on an ivory couch, where it lay for seven days, attended by the senate and ladies of the highest quality in mourning; and then the young senators and knights bore the bed of state through the *via sacra*

vided as means to any certain end, as the tools of a trade; the furniture of a house; ammunition for war; equipage; show.—There is an *apparatus* of things previous, to be adjusted before I come to the calculation itself. *Woodward*.—Ourselves are easily provided for; it is nothing but the circumstances, the *apparatus* or equipage of human life, that costs so much. *Pope's Letters to Gay*.

(2.) *APPARATUS*, in literary matters, is a title of books in the form of catalogues, bibliothecas, dictionaries, &c. for the ease and conveniency of study. The apparatus to Cicero is a kind of concordance, or collection of Ciceronian phrases, &c. The *apparatus sacre* of Possevin, is a collection of all kinds of ecclesiastical authors printed in 1611, in 3 volumes.—Glossaries, comments, &c. are also frequently called *apparatuses*.

(3.) *APPARATUS*, in surgery, the bandages, medicaments, and dressings of a part; or the several matters applied for the cure of a wound, ulcer, or the like. The word is also used for the operation of cutting for the stone. For this there are 3 sorts of apparatus, viz. the small, great, and high apparatus. See *SURGERY*.

* *APPAREL*. *n. f.* It has no plural. [*appareil*, Fr.] 1. Dress; vesture.—I cannot cog and say, that thou art this and that, like many of those lipping hawthorn buds, that come like women in men's *apparel*, and smell like Bucklersbury in simpling time. *Shakespeare's Merry Wives of Windsor*. 2. External habiliments.—

Our late burnt London, in *apparel* new,

Shook off her ashes to have treated you. *Waller*.—At public devotion, his resigned carriage made religion appear in the natural *apparel* of simplicity. *Totter*.

* *To APPAREL*. *v. a.* [from *apparel*, the noun.]

1. To dress; to cloath.—With such robes were the king's daughters that were virgins *appareled*.

2. *Sam. xiii. 18*.—Both combatants were *appareled* only in their doublets and hoses. *Hayward*.

2. To adorn with dress.—She did *apparel* her apparel, and with the preciousness of her body made it most sumptuous. *Sidney*.

3. To cover or deck, as with dress.—You may have trees *appareled* with flowers, by boring holes in them, and putting into them earth, and setting seeds of violets.

Bacon.—Shelves, and rocks, and precipices, and gulfs, being *appareled* with a verdure of plants, would resemble mountains and valleys. *Bentley's Sermons*.

4. To fit out; to furnish; not in use.—It hath been agreed, that either of them should send ships to sea well manned and *appareled* to fight. *Sir J. Hayward*.

APPARELMENT, [from *appareo*, to appear,] resemblance. *Bailey*.

(1.) * *APPARENT*. *adj.* [*apparent*. Fr. *apparens*, Lat.] 1. Plain; indubitable; not doubtful.—The main principles of reason are in themselves *apparent*.

For to make nothing evident of itself unto man's understanding, were to take away all possibility of knowing any thing. *Hooker*.

2. Seeming; in appearance; not real.—The perception intellective often corrects the report of phantasy, as in the *apparent* bigness of the sun, the *apparent* crookedness of the staff in air and water. *Hale's Origin of Mankind*.

3. Visible; in opposition to *secret*.—What secret imaginations we entertained

is known to God; this is *apparent*, that we have not behaved ourselves, as if we preserved a grateful remembrance of his mercies. *Atterbury*.—The outward and *apparent* sanctity of actions should flow from purity of heart. *Rogers*. 4. Open; evident; not known; merely suspected.—

As well the fear of harm, as harm *apparent*, In my opinion ought to be prevented.

Shakefp. Richard III.

5. Certain; not presumptive.

He is the next of blood,

And heir *apparent* to the English crown.

Shakefp. Henry VI.

(2.) *APPARENT*, among astronomers and mathematicians, denotes things as they appear to us, in contradistinction from real or true; thus we say, the *apparent* diameter, distance, magnitude, place, figure, &c. of bodies.

(3.) * *APPARENT*. *n. f.* Elliptically used for *let apparent*.—

Draw thy sword in right.—

—I'll draw it as *apparent* to the crown,

And in that quarrel use it. *Shakefp. Henry VI.*

(4.) *APPARENT CONJUNCTION* of the planets is, when a right line, supposed to be drawn through the centre of two planets, does not pass through the centre of the earth, but through the eye of the spectator.

(5.) *APPARENT HEIRS*, in law, are such, whose right of inheritance is indefeasible, provided they outlive the ancestor; as the eldest son or his issue, who must by the course of the common law be heirs to the father whenever he happens to die.

Heirs *presumptive* are such, who, if the ancestor should die immediately, would in the present circumstance of things be his heirs: but whose right of inheritance may be defeated by the contingency of some nearer heir being born; as a brother or nephew, whose presumptive succession may be destroyed by the birth of a child; or daughter, whose present hopes may be hereafter cut off by the birth of a son.

Nay, even if the estate had descended, by the death of the owner, to such brother, or nephew, or daughter; in the former cases, the estate shall be divested and taken away by the birth of a posthumous child; and, in the latter, it shall also be totally divested by the birth of a posthumous son.

* *APPARENTLY*. *adv.* [from *apparent*.] Evidently; openly.—

Arrest him, officer;

I would not spare my brother in this case,

If he should scorn me so *apparently*.

Shakefp. Comedy of Errors

Vices *apparently* tend to the impairing of health. *Tillotson*.

(1.) * *APPARITION*. *n. f.* [from *appareo*, Lat. to appear.] 1. Appearance; visibility.—

When suddenly stood at my head a dream,

Whose inward *apparition* gently mov'd

My fancy. *Milton*

My retirement tempted me to divert those melancholy thoughts which the new *apparitions* of foreign invasion and domestic discontent gave us. *Deubam*.

2. The thing appearing; a form; a visible object.—

I have mark'd

A thousand blushing *apparitions*.

APPARTMENT. See **APARTMENT**.

APPATURA, in old law, furniture.

APPAUMEE. See **APAUME**.

* **To APPAY.** *v. a.* [*appayer*, old Fr. to satisfy.] 1. To satisfy: to content: whence *well appayed*, is *pleased*; *ill appayed*, is *uneasy*. It is now obsolete.—

How well *appaid* she was her bird to find? *Sidney*.
I am well *appaid* that you had rather believe, than take the pain of a long pilgrimage. *Camden*.—

So only can high justice rest *appaid*. *Milton*.

2. The sense is obscure in these lines:—

Ay, Willy, when the heart is ill assay'd,
How can bagpipe or joints be well *appaid*?

Spenser.

* **To APPEACH.** *v. a.* 1. To accuse; to inform against any person.—He did, amongst many others, *appeach* Sir William Stanley, the lord chamberlain. *Bacon's Henry VII.*—

Were he twenty times

My son, I would *appeach* him. *Shak. Rich. II.*
Disclose

The state of your affection; for your passions
Have to the full *appeached*. *Shakespeare*.

2. To censure; to reproach; to taint with accusation.—

For when Cymochles saw the foul reproach,
Which them *appeached*; prick'd with guilty shame,

And inward grief, he fiercely gen approach,
Resolv'd to put away that lordly shame. *Fairy Q.*

Nor canst, nor durst thou, traitor, on the pain,
Appeach my honour, or thine own maintain.

Dryden.

* **APPEACHMENT.** *n. s.* [from *appeach*.]
Charge exhibited against any man; accusation.—

A busy headed man gave first light to this *appeachment*; but the earl did avouch it. *Hayward*.

—The duke's answers to his *appeachments*, in number thirteen, I find civilly vouched. *Wotton*.

(1.) * **APPEAL.** *n. s.* [from the verb *To appeal*.]

1. An *appeal* is a provocation from an inferior to a superior judge, whereby the jurisdiction of the inferior judge is for a while suspended, in respect of the cause; the cognisance being devolved to the superior judge. *Ayliffe's Parergon*.—

This ring

Deliver them, and your *appeal* to us

There make before them. *Shakeff. Henry VIII.*

Our reason prompts us to a future state,
The last *appeal* from fortune and from fate,
Where God's all righteous ways will be declar'd.

Dryden.

There are distributer's of justice, from whom there lies an *appeal* to the prince. *Addison*. 2. In the common law.—An accusation; which is a lawful declaration of another man's crime before a competent judge, by one that sets his name to the declaration, and undertakes to prove it, upon the penalty that may ensue of the contrary; more commonly used for the private accusation of a murderer, by a party who had interest in the party murdered, and of any felon, by one of his accomplices in the fact. *Cowel*.—

The duke's unjust,

—retort your manifest *appeal*,

your trial in the villain's mouth,

here you come to accuse. *Shakespeare*.

Hast thou, according to thy oath and bond
Brought hither Henry Hereford, thy bold son
Here to make good the boist'rous late *appeal*
Against the duke of Norfolk? *Shakespeare*

3. A summons to answer a charge.—

Nor shall the sacred character of king
Be urg'd to shield me from thy bold *appeal*,
If I have injur'd thee, that makes us equal. *Dryden*

4. A call upon any as witness.—The casting up the eyes, and lifting up of the hands, is a kind of *appeal* to the Deity, the authour of wonders. *Bacon*

(2.) **APPEAL**, in law, the removal of a cause from an inferior to a superior court or judge when a person thinks himself aggrieved by the sentence of the inferior judge. Appeals lie from the ordinary courts of justice to the House of Lords. In ecclesiastical cases, if an appeal brought before a bishop, it may be removed to the archbishop; if before an archdeacon, to the court of arches, and thence to the archbishop and from the archbishop's court to the king's chancery. Appeal, in common law, denotes an accusation by a private subject against another, for some heinous crime; demanding punishment on account of the particular injury suffered, rather than for the offence against the public. This private process, for the punishment of public crimes, had probably its original in those times, when private pecuniary satisfaction, called a *weregild*, was constantly paid to the party injured, or his relations, to expiate enormous offences. This was a custom derived to the English, in common with other northern nations, from their ancestors the ancient Germans: among whom, according to Tacitus, *luitur homicidium certo armentorum ac pecorum numero; recipitque satisfactionem unius domus*. In the same manner, by the Irish Brehon law, in case of murder, the brehon or judge was used to compound between the murderer and the friends of the deceased who prosecuted him, by causing the malefactor to give unto them, or to the child or wife of him that was slain, a recompence which they called an *eriacb*. And thus we find in the Anglo-Saxon laws (particularly those of king Athelstan) the several *weregilds* for homicide established in progressive order, from the death of the ceorl or peasant, up to that of the king himself. And in the laws of Henry I. we have an account of what other offences were redeemable by *weregild*, and what were not so. As therefore during the continuance of this custom, a process was certainly given, for recovering the *weregild* by the party to whom it was due; it seems that when these offences by degrees grew no longer redeemable, the private process was still continued in order to insure the infliction of punishment upon the offender, though the party injured was allowed no pecuniary compensation for the offence. But though appeals were thus, in the nature of prosecutions for some atrocious injury, committed more immediately against an individual, yet it was also anciently permitted, that any subject might appeal another subject of high-treason, either in the courts of common law, or in parliament, or (for treasons committed beyond the seas) in the court of the high constable and marshal. The cognizance of appeals in the latter still continued in force; and so late as 1631, there was a trial by battle

(III) A P P .

chirality, on such
in the first was war-
s 5 Edw. III. c. 9.
the second expressly
so that the only ap-
done within the re-
und mayhem. An ap-
for crimes commit-
ies themselves or their
and the parties them-
et argua. And for these,
a person robbed, ravish-
could be burnt, may in-
vita. The only crime a-
which an appeal can be
ag him, by either murder
this cannot be brought by
only by the wife for the
or by the heir-male for the
r, which heirship was also
ince of Henry I. to the four
pod. It is given to the wife,
is of her husband therefore,
before or pending her appeal,
or, if the marries after judge-
demand execution. The heir,
t also be her-male, and such
next heir by the course of the
de time of the killing of the an-
rable has three exceptions. 1. If
leaves an innocent wife, she only,
er, shall have the appeal. 2. If
s, and the heir be accused of the
rison, who next to him would have
e, shall bring the appeal. 3. If the
husband, the heir may appeal her of
And, by the Statute of Gloucester,
g. all appeals of death must be sued
te and a day after the completion of
by the death of the party, which seems
declaratory of the old common law;
Gothic constitutions we find the same
vis auctoris, que currit adfectus afforem,
mada ei non confiat intra annum a caede
ut quicumque intereo arguet et accuset.
appeals may be brought previous to any in-
ar; and, if the appellee be acquitted
er, he cannot be afterwards indicted for the
offence. In like manner as by the old Go-
thic constitution, if any offender gained a verdict
in favour, when prosecuted by the party injur-
ed, he was also understood to be acquitted of
every prosecution for the same offence; but,
the contrary, if he made his peace with the
party, he might be prosecuted at the suit of
party. And so, in England, if a man be ac-
quitted on an indictment of murder, or furi-
ous, and pardoned by the king, still he ought
to go at large, but he is imprison-
ed till the year and day be past, by
the Statute 1 Hen. VIII. c. 11, in order to
forthcoming to answer any appeal for the same
offence, not having as yet been punished for it;
if he hath been found guilty of man-
slaughter or an indictment, and hath had the be-
nefit of clergy, and suffered the judgment of the
law in law, that none his possit pro eodem

Before this time was made, it was not
usual to indict a man for homicide within the time
limited for appeals; which produced very great
inconvenience. If the appellee be acquitted, the
appellor (by virtue of the Statute of Westm. 1. 23
Edw. I. c. 13.) shall suffer one year's imprison-
ment, and pay a fine to the king, besides restitu-
tion of damages to the party for the imprison-
ment and infamy which he has sustained. And, if
the appellor be incapable to make restitution, his
executors shall do it for him, and also be liable to
imprisonment. This provision, as was foreseen by
the author of Fleta, proved a great discouragement
to appeals; so that thenceforward they
ceased to be in common use. If the appellee be
found guilty, he shall suffer the same judgment,
as if he had been convicted by indictment, but
with this remarkable difference, that on an indict-
ment, which is at the suit of the king, the king
may pardon and remit the execution; on an ap-
peal, which is at the suit of a private subject, to
make an atonement for the private wrong, the
king can no more pardon it, then he can remit
the damages recovered on an action of battery.
In like manner as, while the wergild continued
to be paid as a fine for homicide, it could not be
remitted by the king's authority. And the an-
cient usage was, so late as Henry IV's time, that
all the relations of the slain should drag the appel-
lee to the place of execution a custom, founded
upon that savage spirit of family resentment which
prevailed universally through Europe after the in-
ruption of the northern nations, and is peculiarly
attended to in their several codes of law; and
which still prevails among the wild and untamed
inhabitants of America; as if the finger of nature
had pointed it out to mankind, in their rude and
uncultivated state. However, the punishment of
the offender may be remitted and discharged by
the concurrence of all parties interested, and as
the king by his pardon may frustrate an indict-
ment, so the appellant by his release may discharge
an appeal. "nam quilibet potest remanere juri pro
se vindex." "To APPEAL, v. n. [appello, Lat.] 1. To
transfer a cause from one to another; with the
particles *to* and *from*.—From the ordinary there-
fore they appeal to themselves. Hooker. 2. To re-
fer to another as judge.—Hence, as a declared
sign of force, upon the person of another, whereas
there is no common superior on earth to appeal to
for relief, is the state of war; and it is the want
of such an appeal gives a man the right of war,
even against an aggressor, though he be in society
and a fellow-subject. Locke.—
They knew no foe, but in the open field,
And to their cause and to the gods appeal'd.
Esper. 3. To call another as witness.—Whether this, that
the soul always thinks, be a self-evident propo-
sition, I appeal to mankind. Locke.—4. To charge
with a crime; to accuse. a term of law.—
One but fathers us,
As well appeareth by the cause you come,
Namely, 't appeal each other of high treason.
Shakepeare. • APPEALANT. n. s. (from appeal.) He that
appeals.—

Ready

Lords *appealants*,

Your differences shall all rest under gage,
Till we assign you to your days of trial. *Shakesp.*

* **APPEALER.** *n. f.* [from *appeal*.] One who makes an appeal.

* **To APPEAR.** *v. n.* [*appareo*, Lat.] 1. To be in sight; to be visible.—As the leprosy *appeareth* in the skin of the flesh. *Lev. xiii. 43.*—

And half her knee, and half her breast *appear*,
By art, like negligence, disclos'd and bare.

Prior.

2. To become visible as a spirit.—For I have *appeared* unto thee for this purpose, to make thee a minister and a witness. *Acts, xxvi. 16.* 3. To stand in the presence of another; generally used of standing before some superiour.—When shall I come and *appear* before God? *Psalms xlii. 2.* 4. To be the object of observation.—Let thy work *appear* unto thy servants, and thy glory unto their children. *Psalms xc. 16.* 5. To exhibit one's self before a court of justice.—

Keep comfort to you, and this morning see

You do *appear* before them. *Shakesp. Hen. VIII.*

6. To be made clear by evidence.—Egfrid did utterly waste and subdue it, as *appears* out of Beda's complaint against him; and Edgar brought it under his obedience, as *appears* by an ancient record. *Spenser's Ireland.* 7. To seem in opposition to reality.—His first and principal care being to *appear* unto his people, such as he would have them be, and to be such as he *appeared*. *Sidney.*—

My noble master will *appear*

Such as he is, full of regard and honour. *Shakesp.*

8. To be plain beyond dispute.—From experiments, useful indications may be taken, as will *appear* by what follows. *Arbutnot.*

(1.) * **APPEARANCE.** *n. f.* [from *To appear*.]

1. The act of coming into sight; as, they were surprised by the sudden *appearance* of the enemy.

2. The thing seen; as, the remarkable *appearances* in the sky. 3. *Phænomena*; that quality of any thing which is visible.—The advancing day of experimental knowledge discloseth such *appearances*, as will not lie in any model extant. *Glanvill's Sceptis.* 4. Semblance; not reality.—He increased in estimation, whether by destiny, or whether by his virtues, or at least by his *appearances* of virtues. *Hayward.*

Heroic virtue did his actions guide,

And he the substance not th' *appearance* chose.

Dryden.

The hypocrite would not put on the *appearance* of virtue, if it was not the most proper means to gain love. *Addison.* 5. Outside; show.—Under a fair and beautiful *appearance* there should ever be the real substance of good. *Rogers.* 6. Entry into a place or company.—Do the same justice to one another, which will be done us hereafter by those, who shall make their *appearance* in the world, when this generation is no more. *Addison.* 7. Apparition; supernatural visibility.—I think a person terrified with the imagination of spectres, more reasonable than one who thinks the *appearance* of spirits fabulous. *Addison.* 8. Exhibition of the person to a court.—

I will not tarry; no, nor ever more

—on this business my *appearance* make

ny of their courts.

Shakesp. Hen. VIII.

9. Open circumstance of a case.—

Or grant her passion be sincere,
How shall his innocence be clear?

Appearances were all so strong,

The world must think him in the wrong. *Swift.*

10. Presence; mein.—Health, wealth, victory, and honour, are introduced; wisdom enters the law and so captivates with her *appearance*, that he gives himself up to her. *Addison.* 11. Probability; seeming; likelihood.—There is that which hath no *appearance*, that this priest being utterly unacquainted with the true person, according to whose pattern he should shape his counterfeit should think it possible for him to instruct the player. *Bacon.*

(2.) **APPEARANCE**, in law, signifies a defendant filing a common or special bail, on any process issued out of a court of judicature.

(3.) **APPEARANCE**, in perspective, the representation or projection of a figure, body, or object, upon the perspective plane.

(4.) **APPEARANCE DIRECT**, in optics, the view or sight of any object by direct rays; without either refraction or reflection.

(5.) **APPEARANCES**, in astronomy, &c. are more usually called *apphenomena* and *phases*.

(6.) **APPEARANCES**, in physiology. See *PHENOMENA*.

(7.) **APPEARANCES, TO SAVE**, to discharge one's duty seemingly, or acquit one's self of the formalities and externals thereof; so as to save character, and avoid giving offence.

* **APPEARER.** *n. f.* [from *To appear*.] The person that appears.—That owls and ravens and ominous *appearers*, and presignify unlucky events was an augural conception. *Brown.*

* **APPEASABLE.** *adj.* [from *To appease*.] That may be pacified; reconcileable.

* **APPEASABLENESS.** *n. f.* [from *To appease*.] The quality of being easily appeased; reconcileableness.

* **To APPEASE.** *v. a.* [*appaiser*, Fr.] 1. To quiet; to put in a state of peace.—By his counsel he *appeaseth* the deep, and planteth islands therein. *Eccclus. xliii. 23.*—England had no leisure to think of reformation, till the civil wars were *appeased*, and peace settled. *Davies on Ireland.* To pacify; to reconcile; to still wrath.—So Simon was *appeased* towards them, and fought no more against them. *1 Mac. xiii. 47.*—

O God! if my deep prayers cannot *appease* thee,

Yet execute thy wrath on me alone.

Shakesp. Rich. II.

The rest shall hear me call, and oft be warned
Their sinful state, and to *appease* betimes
Th' incensed Deity.

Milton.

3. To still; to quiet.—

The rest

They cut in legs and fillets for the feast,
Which drawn and serv'd, their hunger they *appease*.

Dryden.

* **APPEASEMENT.** *n. f.* [from *To appease*.] A state of peace.—Being neither in numbers nor courage great, partly by authority, partly by treaty, they were reduced to some good *appeasements*. *Hayward.*

* **APPEASE**

* **APPEASER.** *n. f.* [from *To appease*.] He that pacifies others; he that quiets disturbances.

APPEASING REMEDIES, in medicine, are those which assuage the pain in a disease, and give the patient some rest, and at the same time contribute to the cure. These amount to the same with what we otherwise call anodynes, &c.

(1.) * **APPELLANT.** *n. f.* [*appello*, Lat. to call.] 1. A challenger; one that summons another to answer either in the lists or in a court of justice.—

In the devotion of a subject's love,
And free from other misbegotten hate,
Come I *appellant* to this princely presence.

Shakes.

This is the day appointed for the combat,
And ready are th' *appellant* and defendant,
Th' armourer and his man, to enter the lists.

Shakes.

These shifts refuted, answer thy *appellant*,
Though by his blindness maim'd for high attempts,

Who now defies thee thrice to single fight. *Milt.*

2. One that appeals from a lower to a higher power.—An appeal transfers the cognizance of the cause to the superior judge; so that, pending the appeal, nothing can be attempted in prejudice of the *appellant*. *Ayliffe's Parergon.*

(2.) **APPELLANTS**, in church history, those among the French clergy, who refused to subscribe the bull *unigenitus*, issued by Clement XI. in 1713, and appealed from it, either to the pope better informed, or to a general council. The French bishops, priests, monks, and even nuns, were divided into appellants, and non-appellants. The Jesuits and their followers were generally appellants.

* **APPELLATE.** *n. f.* [*appellatus*, Lat.] The person appealed against.—An appellatory libel ought to contain the name of the party appellant; the name of him from whose sentence it is appealed; the name of him to whom it is appealed; from what sentence it is appealed; the day of the sentence pronounced, and appeal interposed; and the name of the party *appellee*, or person against whom the appeal is lodged. *Ayliffe's Parergon.*

* **APPELLATION.** *n. f.* [*appellatio*, Lat.] Name; word by which any thing is called.—Nor are always the same plants delivered under the same name and appellations. *Brown's Vulgar Errors.*—Good and evil commonly operate upon the mind of man, by respective names or appellations, by which they are notified and conveyed to the mind. *South.*

(1.) **APPELLATIONS RIDICULOUSLY CORRUPTED.** Nothing can be more foreign to the original meaning of many words and proper names, than their present appellations, frequently owing to the history of those things being forgotten, or an ignorance of the language in which they were expressed. Who, for instance, would suppose that the head on the French coast, near Calais, called by our seamen *Blackness*, could be so entitled from its French name of *Blanc Nez*, or, the *White Head-land*? Henry VIII. having taken the town of Bullogne in France, the gates of which he brought to Harde in Kent, where they are still remaining, the flatterers of that reign high-

ly magnified this action, which like *Porto-Bello*, became a popular subject for signs; and the port or harbour of Bullogne, called *Bullogne mouth*, was accordingly set up at a noted inn in Holburn; the name of the inn long out-living the sign and fame of the conquest, an ignorant painter employed by a no less ignorant landlord, to paint a new one, represented it by a bull and a large gaping human mouth (answering to the vulgar pronunciation of *Bull and Mouth*.) The same piece of history gave being to the *bull and gate*, originally meant for Bullogne gate, and represented by an embattled gate or entrance into a fortified town. The *barber's pole* has been the subject of many conjectures; some conceiving it to have originated from the word *poll*, or head, with several other conceits as far-fetched and as unmeaning: but the true intention of that party-coloured staff was to show that the master of the shop practised surgery, and could breathe a vein as well as mow a beard; such a staff being to this day, by every village practitioner, put into the hand of a patient undergoing the operation of phlebotomy. The white band which encompasses the staff, was meant to represent the fillet, thus elegantly twisted about it. Nor were the *Queuers* (at this time a common sign of a public-house) less expressive, being the representation of a kind of draught board called *tables*, and showed that there that game might be played. From their colour which was red, and the similarity to a lattice, it was corruptly called the *red lettuce*, which word is frequently used by ancient writers to signify an alehouse. The Spectator has explained the sign of the *Bell Savage inn* plausibly enough, in supposing it to have been originally the figure of a beautiful female found in the woods, called in French *la belle sauvage*. But another reason has since been assigned for that appellation, namely, that the inn was once the property of Lady Arabella Savage, and familiarly called Bell Savage's inn, probably represented, by a bell and a savage or wild man, which was a rebus for her name; rebuses being much in fashion in the 16th century. The *three blue balls* prefixed to the doors and windows of pawn brokers shops, by the vulgar humorously enough said to indicate that it is two to one that the things pledged are ever redeemed, were in reality the arms of a set of merchants from Lombardy, who were the first that publicly lent money on pledges. They dwelt together in a street, from them named Lombard street, in London, and they also gave their name to another at Paris. The appellation of Lombard was formerly all over Europe considered as synonymous to that of usurer. At the institution of yeomen of the guards, they used to wait at table on all great solemnities, and were ranged near the buffets; this procured them the name of *buffetiers*, not very unlike in sound to the jocular appellation of *beef-eaters*, now given them; though probably it was rather the voluntary misnomer of some wicked wit, than an accidental corruption arising from ignorance of the French language. The opprobrious title of *bum-bayliffe*, so constantly bestowed on the sheriffs officers, is, according to Judge Blackstone, only the corruption of *bound bayliffe*, every sheriff's officer being obliged to en-

any thing.) 1. To hang any thing upon another; as, the inscription was *appended* to the column; the fact is *appended* to the record. 2. To add to something, as an accessory, not a principal part.

* APPENDAGE. *n. f.* (French.) Something added to another thing, without being necessary to it, whence, as a portion to the house.—*Modesty* is the appendage of sobriety, and is to chastity, to temperance, and to humility, as the fringes are to a garment. *Taylor's Rule of living holy.*—None of the laws of motion now established will serve to account for the production, motion, or number of bodies, nor their *appendages*, though they may help us a little to conceive their appearance. *Chene.*—He was so far from over-valuing any of the *appendages* of life, that the thoughts of life did not affect him. *Atterbury.*

1. APPENDANT. *adj.* (French.) 1. Hanging to something else. 2. Belonging to; annexed; concomitant.—as that despite the world, and all its *appendant* vanities, is the most secure. *Taylor.*—He that looks for the blessings *appendant* to the sacrament, must expect them upon no terms, but of a worthy communion. *Taylor.*—Riches multiplied beyond the proportion of our character, and the wants *appendant* to it, naturally dispose men to forget God. *As.* 2. In law, *appendant* is anything belonging to another, as *enclosures* *pendant*, with the curtilage, or, *ad-*

pendent, to another thing. But a thing is not propitiated as an object of worship, when it is set up by itself, and not by way of addition or ornament to another thing. *Stillingfleet.*—Norman became an *appendix* to England, the people of Wales to the English, than they gave to it. *the Civil Law of England.* 3. An adjunct or concomitant.—if concurrent *appendages* of the subject ought to be surveyed, in order to procure truth concerning it. *Harris.*

(2.) APPENDIX, in anatomy. See *ANATOMY* § 273, 293.

(3.) APPENDIX, in literature, a treatise or supplement added at the end of a work, to render more complete.

APPENNINES, a chain of mountains, which divide Italy through its whole length. See *ANATOMY*.

APPENSA, or APPENSA MONTANA, hills are outwardly applied, by hanging about the neck. The word comes from *ad*, and *pendere* to hang to. Such are direct assaults, military enterprises, &c.

APPERCEPTION, or APPERCEPTION, is used by Leibnitz and his followers for consciousness.

APPERSHOVEN, a village of Germany.

Subia, on the Kyffel. Long. 8. 50. E. Lat. 31. 40. N.

* **To APPERTAIN.** *v. n.* [*appartenir*, Fr.]

1. To belong to as of right: with *to*.—The honour of devising this doctrine, that religion ought to be enforced by the sword, would be found *appertaining* to Mahomed the false prophet. *Raleigh*.

The Father, & whom in heav'n supreme Kingdom, and power, and glory *appertains*, Hath honour'd me, according to his will.

Paradise Lost.

2. To belong to by nature or appointment.—If the soul of man did serve only to give him being in this life, then things *appertaining* to this life would content him, as we see they do other creatures. *Hooker*.—And they roasted the passover with fire, as *appertaineth*: as for the sacrifices they sod them in brass pots. 1 *Esdra*s.—Both of them seem to generate any other effect, but such as *appertain* to their proper objects and senses. *Bacon*.

I it expected, I should know no secrets

That *appertain* to you? *Shakefp. Julius Cesar.*

* **APPERTAINMENT.** *n. s.* [from *appertain*.]

That which belongs to any rank or dignity.—

He sent our messengers, and we lay by

Our *appertainments*, visiting of him. *Shakefp.*

* **APPERTENANCE.** *n. s.* [*appartenance*, Fr.]

That which belongs or relates to another thing.—

On they which behold the controversy of divinity condemn our enquiries in the doubtful *appertenances* of arts, and receptaries of philosophy? *Brown's False Errours.*

APPERTINANCES. See **APPURTENANCES.**

* **APPERTINENT.** *adj.* [from *To appertain*.]

Relating; relating.—

We know how apt our love was to accord

To furnish him with all *appertinents*

Belonging to his honour. *Shakefp. Henry V.*

* **APPETENCE.** } *n. s.* [*appetentia*, Lat.] Car-

* **APPETENCY.** } nal desire; sensual desire.—

Bred only and completed to the taste

Of lustful *appetence*; to sing, to dance,

To dress, to trouble the tongue, and roll the eye.

Milton.

* **APPETIBILITY.** *n. s.* [from *appetible*.] The

quality of being desirable.—That elicitation which

the schools intend, is a deducing of the power of

the will into act, merely from the *appetibility* of

the object, as a man draws a child after him with

the sight of a green bough. *Bramhall against Hobbes.*

* **APPETIBLE.** *adj.* [*appetibilis*, Lat.] De-

sirable; that which may be the object of appetite.

—Power both to flight the most *appetible* objects,

and to controul the most unruly passions. *Bram-*

hall against Hobbes.

(1.) * **APPETITE.** *n. s.* [*appetitus*, Lat.] 1.

The natural desire of good; the instinct by which

we are led to seek pleasure.—The will, properly

and strictly taken, as it is of things which are re-

ferred unto the end that men desireth, differeth

greatly from that inferior natural desire, which

we call *appetite*. The object of *appetite* is what-

ever sensible good may be wished for; the ob-

ject of will is that good which reason does lead us

to seek. *Hooker.* 2. The desire of sensual pleasure.

Why, she would hang on him,

As if increase of *appetite* had grown

By what it fed on. *Shakefp. Hamlet.*

Urge his hateful luxury,
And bestial *appetite* in change of lust.

Shakefp. Richard III.

Each tree

Loaden with fairest fruit, that hung to th' eye

Tempting, stirr'd in me sudden *appetite*

To pluck and eat. *Milton's Paradise Lost.*

3. Violent longing; eagerness after any thing.—

No man could enjoy his life, his wife, or goods,

if a mightier man had an *appetite* to take the same

from him. *Davies*.—Hopton had an extraordinary

appetite to engage Waller in a battle. *Clarendon.*

4. The thing eagerly desired.—Power being the

natural *appetite* of princes, a limited monarch can-

not gratify it. *Swift.* 5. Keenness of stomach;

hunger; desire of food.—There be four principal

causes of *appetite*; the refrigeration of the sto-

mach, joined with some dryness; contraction;

vellication, and absterfion; besides hunger, which

is an emptiness. *Bacon's Natural History*.—There

is continual abundance, which creates such an *ap-*

petite in your reader, that he is not cloyed with

any thing, but satisfied with all. *Dryden.* 6. It

has sometimes of before the object of desire.—The

new officer's nature needed some restraint to his

immoderate *appetite* of power. *Clarend.* 7. Some-

times *to*.—We have generally such an *appetite* to

praise, that we greedily suck it in. *Government of*

the Tongue.

(2.) **APPETITE**, [from *ad*, to, and *peto*, to crave,]

in medicine, is used to denote a natural periodical

desire to eat and drink, in order to repair what had

been wasted by the excretions of the body. A loss

of appetite is called anorexia. A preposterous ap-

petite for things not proper for food is called *pica*.

An immoderate appetite is called *bulimia*, or *fames*

canina. Some, however, distinguish between the

bulimia, and canine appetite; making it the dis-

tinguishing character of the latter, that it is at-

tended with a lientery, or other coeliacal flux.

See § 4 and 5.

(3.) **APPETITE**, in philosophy, a desire of en-

joying something wanted; or a complacency in

the fruition of a thing present. Some philosophers

define appetite, an inclination of the soul towards

some object considered as good; or a propensity

to an object, in respect of the good that is appre-

hended in it. Others distinguish it into voluntary

and natural. The first is the will itself, acting un-

der a competent knowledge of what is wanted;

the second is a kind of instinct, whereby we are

mechanically driven to consult our own preserva-

tion. Others again divide it into SENSITIVE and

RATIONAL; see § 6 and 7. Appetite is restrain-

ed, by Hutcheson, to such of our desires as have

a previous painful and uneasy sensation, antec-

ed to any opinion of good in the object; nay,

so as that the object is often chiefly esteemed good

only for its allaying this pain or uneasiness, or if

it give also positive pleasure, yet the uneasy sensa-

tion is previous to, and independent of this opini-

on of good in it.

(4.) **APPETITE, DEFECTIVE.** The defect of

appetite is of two kinds, and is usually divided, by

medical writers, into ANOREXIA and NAUSEA,

which see.

(5.) **APPETITE, EXCESSIVE.** See **BULIMIA,**

and **OREXIS.**

(6.) **APPETITE, RATIONAL**, is that which arises from an apprehension of good in the object, as conceived by the understanding, guided by reason, and proportioned to the value of the object.

(7.) **APPETITE, SENSITIVE**, is that which arises from a notion of goodness in the object, as impressed by the impulse of the senses, by a blind propensity, without any determinate ideas, of the real goodness of the qualities for which we desire it.

(8.) **APPETITES, DISTINGUISHED FROM PASSIONS**. Appetites are passions directed to general objects, in contradistinction to passions directed to particular objects, which retain their proper name. Thus we say an *appetite* for fame, for glory, for conquest, for riches; but we say the *passion* of love, of hatred, &c. Appetite may be also distinguished from passion, since the latter has no existence till a proper object be presented; whereas the former exists first, and then is directed to an object.

* **APPETITION**. *n. f.* [*appetitus*, Lat.] Desire. —The actual *appetition* or fastening our affections on him *Hammond's Practical Catechism*. —We find in animals an estimative or judicial faculty, an *appetition* or aversion. *Judge Hale*.

* **APPETITIVE**. *adj.* [from *appetite*.] That which desires; that which has the quality of desiring —The will is not a bare *appetitive* power as that of the sensual appetite, but is a rational appetite. *Hale's Origin of Mankind*. —I find in myself an *appetitive* faculty always in exercise, in the very height of activity and invigoration. *Norris*.

APPETITUS CANINUS, a ravenous appetite, like that of a dog.

APPIADES, in mythology, five divinities so called because their temples were at Rome near the fountains of Appius, viz. Venus, Pallas, Vesta, Concord, and Peace.

APPIAN, an eminent writer of the Roman history in Greek, under the reign of Trajan and Adrian. He was a native of Alexandria in Egypt; whence he went to Rome, and distinguished himself so well as an advocate, that he was chosen one of the procurators of the empire, and the government of a province was committed to him. He did not complete the Roman history in a continued series; but wrote distinct histories of all nations that had been conquered by the Romans, in which he placed every thing relating to those nations in the proper order of time. His style is plain and simple: in the opinion of Phocius, he has shown the greatest knowledge of military affairs; and the happiest talent at describing them, of any of the historians; for while we read his work, we in a manner see the battles he describes. Of all this voluminous work there remains only what treats of the Punic, Syrian, Parthian, Mithridatic, and Spanish wars with those against Hannibal, the civil wars, and the wars in Illyricum, and some fragments of the Celtic or Gallic wars.

APPIAN WAY, } a road that reached from Rome
APPIA VIA, } through Capua to Brundisium,

between 330 and 340 miles long. Appius Claudius, Cæcus, the Censor, in the year of the city 444, carried it from the Porta Capena to Capua; Cæsar from Capua to Benevento; and Augustus thence to Brundisium. It was laid with hard stone, brought from a great distance;

large and squared; and it was so wide, that several waggons could go abreast, being above 15 feet broad. Statius calls it *the queen of roads*. Its course is described by Horace, Strabo, and Antonine. Caius Gracchus placed stones along it called *cippi* and *termini*, to mark the miles, afford foot passengers resting seats, and enable equestrian travellers to mount, there being then no stirrups used. Great part of this road still remains entire.

APPII FORUM, a town on the S. W. of Italy, about 50 miles S. of Rome, and 18 from the Three Taverns; where the Christians of Rome came to meet Paul in his journey from Puteoli, to that metropolis of the world.

APPIN, a parish of Scotland, in Argyleshire, united to that of Lismore, the two together forming an extent of no less than 63 miles in length, by 10 and in some places 16 miles in breadth. The soil of Appin is equally suited to corn and grass; but the greatest part of the country being mountainous, it is best adapted for sheep, of which there are 25,000 in the parish. Many of the sheep farms are very extensive; and one of them is 18 miles long. The climate, though moist, is healthy and remarkable for the longevity of its inhabitants. Mr McNicol, the minister, in his Statistical report to Sir John Sinclair, says, that "many live to the ages of from 84 to 96, and even to 100 years; that one man died in 1790, aged 105," and that "in 1744, he saw a woman who was 116!" The population of Appin, in 1791, was 2405. The roads and bridges are good. The massacre of Glenco, that eternal stain to the reign and character of William III. happened in this parish. See **GLENCO** and **LISMORE**.

APPIUS CLAUDIUS. See **CLAUDIUS**.

* **To APPLAUD**. *v. a.* [*applaudo*, Lat.] 1. To praise by clapping the hand.—

I would *applaud* thee to the very echo,
That should *applaud* again. *Shakspeare, Macbeth*

2. To praise in general.—
Nations unborn your mighty names shall sound,
And worlds *applaud* that must not yet be found.

* **APPLAUDER**. *n. f.* [from *applaud*.] He that praises or commends.—I had the voice of my single reason against it, drowned in the noise of a multitude of *applauders*. *Glanville's Scyllis*.

(1.) * **APPLAUSE**. *n. f.* [*applausus*, Lat.] Approval loudly expressed; praise: properly a clap.

This general *applause*, and cheerful shout,
Argues your wisdom and your love to Richard.

Sylla wept,
And chid her barking waves into attention;
And fell Charybdis murmur'd soft *applause*.

Those that are so fond of *applause*, how little do they taste it when they have it? *South*.—

See their wide streaming wounds; they need
they came

For pride of empire, nor desire of fame;
Kings fight for kingdoms, madmen for *applause*;
But love for love alone, that crowns the lover's
cause.

(2.) **APPLAUSE**, in antiquity, differed from acclamation as the latter was articulate and performed

ed with the voice, the former with the hands.— Among the Romans, applause was an artificial kind of noise, made by the audience or spectators to express their satisfaction. There were three species of applause, denominated from the different noises made in them, viz. *Bombus*, *imbrices*, and *Tessæ*; the first a confused din, made either by the hands or the mouth; the second and third, by beating on a sort of sounding vessels placed in the theatres for this purpose.— Romans were instructed to give applause with skill; there were even masters who professed to teach the art. The proficient in this way let themselves out for hire to the vain-glorious among the poets, actors, &c. and were properly disposed to support loud applause. These they called *Laudicani*, and *Tessalarii*. At the end of the play, a loud peal of applause was expected, and even asked of the audience, either by the chorus or the person who spoke last. The formula was, *Spectatores plaudite*, or *Valete et plaudite*. The *plausores*, or applauders, were divided into chori, and disposed in theatres opposite to each other like the chorists in cathedrals, so that there was a kind of concert of applauses.

(1.) * APPLE. *n. s.* [*appel*, Saxon.] 1. The fruit of the apple tree.

Tall thriving trees confess'd the fruitful mold;
The red'ning apple ripens here to gold.

Pope's Odyssey.

2. The pupil of the eye.—He instructed him; he kept him as the apple of his eye. *Deut.* xxxii. 10.

(3.) APPLE, the fruit of the *pyrus malus*. See *Pears*.

APPLE, ADAM'S. See ADAMI POMUM, ANATOMY, § 355, and CITRUS.

APPLE BITTER. See COLOCYNTHIS.

(1.) APPLEBY, or APULBY, anciently ABALBY, a town in the county of Westmoreland, pleasantly situated on the Eden, and almost surrounded by it. It was a Roman station in the time of Aurelian, and is situated on the Roman military road, which crosses the county from Staincliffe to Cumberland. It is the only borough in Westmoreland, and sends two members to parliament. It has 4 fairs; on Whitsun Eve, Whitsun Monday, 10 June, and 10 August, with a market every Saturday. From the old English histories it appears that parliaments were formerly held in it. It was once a very considerable town, and had great privileges; but it is long ago gone to decay, and now only consists of mean houses in one broad street, which runs with an easy ascent from N. to S. and at the head of which is the castle. It has two churches; a town-hall in which the assizes are held; a county-jail; and an hospital for a governess and 12 widows, founded in 1551 by a daughter of Lord Clifford. It is governed by a mayor, 12 aldermen, a common council, and 2 serjeants at mace, &c. and is said to have the best corn market in these northern parts. It lies 10 miles S. E. of Penrith, and 266 N. N. W. of London. Long. 2. 34. W. Lat. 54. 34. N.

(2—6.) APPLEBY, the name of other five small towns or villages in England; viz. 2. one in Derbyshire between Burton upon Trent and Ashby de-la-Zouch: 3. another near Hertford: 4. AP-

PLEBY MAGNA, and 5. APPLEBY PARVA, in Leicestershire, near Normantown: and 6. one in Lincolnshire, between Glanford bridge and Burton upon Trent.

(1.) APPLECROSS, a parish of Scotland in Ross-shire, which derives its name from an ancient proprietor, in memory of whom five apple trees were planted cross-wise, and have ever since been perpetuated by his successors. It was formerly called *Comrick*. It extends about 20 miles along the coast in a direct line; but reckoning all the curves and windings of the shore cannot be under 90 miles long. It is mountainous and rocky, but the valleys are fertile, and produce oats, barley, potatoes, &c. There are about 3000 black cattle in the parish, besides sheep and goats; and many wild animals, such as deer, roes, badgers, otters, foxes, &c. A flock of 40 or 50 deer are often seen together on the hills. There is a copper mine in it, reckoned, by Mr Williams, as rich as any in the kingdom. It exports black cattle, butter, cheese, fish, and kelp. Mr M'Queen, the minister, in his Statistical report to Sir J. Sinclair, states the population, in 1792, at 1734 souls, which is nearly double the number in 1755, notwithstanding emigrations. Mr M'Queen ascribes the increase chiefly to two causes, the abolition of servitudes, and the cultivation of potatoes. Gaelic is the only language. The chief disadvantage Applecross labours under is the want of salt.

(2.) APPLECROSS, a river, which runs through the parish so called. See N° 1.

APPLE, CUSTARD, See ANNONA.

APPLEDORE, 1. a small port in Devonshire, on the coast, the first harbour within the bar of Barnstable. 2. a village in Kent, near Tenterden, on the Rother, 54 miles from London.

APPLEDORF-COMB, a village in Isle of Wight.

APPLEDRUM, a small town in Suffex, between Chichester and Thorney Island.

APPLE FLY, in natural history, the name given by authors to a small green fly found sometimes within an apple, and hatched of a worm or maggot, very frequently found infesting that fruit.

APPLEFORD, a village in Berkshire.

(1.) APLEGARTH, a forest in the N. Riding of Yorkshire, near Richmond.

(2.) APLEGARTH, } A parish of Scotland, in
APLEGIRTH, } Dumfries-shire, separated from those of Johnston and Lochmaben by the Annan, and from that of Drysdale by the Dryfe; extending about 6 miles from S. to N. and from W. to E. about 5. It is situated about 11 miles from Dumfries, 12 from Annan, (its nearest sea ports) and 60 from Edinburgh and Glasgow. The population, in 1792, as stated in Sir J. Sinclair's Statistical Account, was 741 souls; and it had decreased 156 within 37 years. The parish contains about 2000 sheep, 1500 black cattle, and 150 horses. It exports barley to Liverpool and oats to Greenock.

APPLE, GOLDEN, in ancient church ornaments, the globular part of the candlestick. *Du Cange*.

* APPLE-GRAFT. *n. s.* [from *apple* and *graft*.] A twig of apple-tree grafted upon the stock of another tree.—We have seen three and twenty sorts of *apple grafts* upon the same old plant, most of them adorned with fruit. *Boyle*.

APPLE

APPLE JUICE. The juice of apples is a men-
struum for iron. A solution of iron in the juice
of the apples, called *golden rennets*, evaporated to a
thick consistence, proves an elegant chalybeate,
which keeps well.

APPLE, MAD. See *MELONGENA*.

APPLE, MALE BALSAM. See *MOMORDICA*.

APPLE, MARCHASITE, so called by Dr Grew,
on account of its figure, as being round except
on one side, where it falls in, and having a stalk
like a young apple.

APPLE, OAK, an excrescence or exudation of
the juice of the oak, joined with a degree of pu-
trefaction.

(1.) * **APPLE OF LOVE.**—*Apples of love* are of
three sorts; the most common having long trail-
ing branches, with rough leaves and yellow joints,
succeeded by apples, as they are called, at the
joints, not round, but bunched; of a pale orange
shining pulp, and seeds within. *Mortimer's Hus-
bandry*.

(2.) **APPLE OF LOVE.** See *LYCOPERSICON*.

APPLE OF THE EYE. A name not unfrequent-
ly given to the PUPIL. See *ANATOMY, INDEX*.

APPLE OF WAX. See *POMUM DE CERA*.

APPLE, PINE. See *PINUS*.

APPLESHAW, a village in Hampshire, four
miles from Andover. Fairs, 23d May and 5 Nov.

APPLE, SOAP. See *SAPINDUS*.

APPLE, STAR. See *CHRYSOPHYLLUM*.

* **APPLE-TART.** [from *apple* and *tart*. A tart
made of apples.—

What, up and down carv'd like an *apple-tart*!

Shakesp.

* **APPLETHWAITE,** a village in Westmoreland,
near Winandermere Lake

APPLETON, the name of 9 English villages,
viz. 1. in Berkshire, near Abingdon: 2. in Che-
shire, near Warrington; 3. in Lancashire, near
Prescot: 4. in Norfolk, N. of Flitcham: 5. EAST,
and 6. WEST, in Yorkshire, near Bedal: 7. in
Yorkshire, near Rydel: 8. in Yorkshire, near Skip-
ton: and 9, in Yorkshire, near Tadcaster.

APPLETON NUN, a small town, between Selby
and York.

* **APPLE-TREE.** *n. f.* [from *apple* and *tree*.]
The fruit of this tree is for the most part hollowed
about the foot stalk; the cells inclosing the seed
are separated by cartilaginous partitions; the juice
of the fruit is sowrish, the tree large and spread-
ing; the flowers consist of five leaves, expanding
in form of a rose. There are a great variety of
these fruits. Those for the dessert are, the white
juniting, Margaret apple, summer pearmain, sum-
mer queening, embroidered apple, golden reinette,
summer white Colville, summer red Colville, sil-
ver pippin, aromattick pippin, the gray reinette,
la haute-bonté, royal russeting, Wheeler's russet,
Sharp's russet, spice apple, golden pippin, non-
pariel, and Papi. Those for the kitchen use are,
codling, summer, marigold, summer red pearmain,
Holland pippin, Kentish pippin, the hanging bo-
dy, Loan's pearmain, French reinette, French pip-
pin, royal russet, monstrous reinette, winter pear-
main, pomme violette, Spencer's pippin, stone pip-
pin, oaken pippin. And those generally used for cy-
 are, Devonshire royal wilding, redstreaked
le, the whitfour, Herefordshire underleaf, John

apple, &c. *Miller*.—Oaks and beeches last longer
than *apples* and pears. *Bacon*.

Thus *apple-trees*, whose trunks are strong to
bear

Their spreading boughs, exert themselves in air,
Dryden.

APPLE-TREE-WICK, a village in Yorkshire, near
Skipton. It has a fair on Oct. 2.

* **APPLE-WOMAN.** *n. f.* [from *apple* and *wo-
man*.] A woman that sells apples, that keeps fruit
on a stall.—Yonder are two *apple-women* scolding,
and just ready to uncoil one another. *Arbutnot
and Pope*.

* **APPLIABLE.** *adj.* [from *apply*.] That which
may be applied. For this word the moderns use
applicable; which see.—Limitations all such prin-
ciples have, in regard of the varieties of the mat-
ter whereunto they are *applicable*. *Hooker*.—[H]
that I have said of the heathen idolatry is *appli-
ble* to the idolatry of another sort of men in the
world. *South*.

* **APPLIANCE.** *n. f.* [from *apply*.] The act of
applying; the thing applied.—

Diseases desp'rate grown,

By desperate *appliance* are relieved. *Shakesp.*

Are you chaf'd?

Ask God for temperance, 'tis the *appliance*
only

Which your desire requires. *Shakespeare*

* **APPLICABILITY.** *n. f.* [from *applicable*.]
The quality of being fit to be applied to some
thing.—The action of cold is composed of two
parts; the one pressing, the other penetration,
which requires *applicability*. *Diab*

* **APPLICABLE.** *adj.* [from *apply*.] That
which may be applied, as properly relating to
something.—What he says of the portrait of any
particular person, is *applicable* to poetry. In the
character, there is a better or a worse. The
the better is a panegerick, and the worse a
Dryden.—It were happy for us, if this compo-
were *applicable* only to the heathen world.

* **APPLICABLENESS.** *n. f.* [from *applicable*.]
Fitness to be applied.—The knowledge of facts
may possibly, by that little part which we have al-
ready delivered of its *applicableness*, be of use in
natural philosophy. *Boyle*.

* **APPLICABLY.** *adv.* [from *applicable*.] In
such a manner as that it may be properly applied.

(1.) * **APPLICATE.** *n. f.* [from *apply*.] A right
line drawn across a curve, so as to bisect the di-
meter thereof. *Chambers*.

(2.) **APPLICATE NUMBER.** See *CONCRETE*.

(3.) **APPLICATE ORDINATE,** in geometry, a
right line at right angles, applied to the axis of
any conic section and bounded by the curve.

(1.) * **APPLICATION.** *n. f.* [from *apply*.] 1.
The act of applying any thing to another; as, he
mitigated his pain by the *application* of emollients.
2. The thing applied; as, he invented a new *ap-
plication*, by which blood might be stanch'd.
3. The act of applying to any person, as a solic-
itor, or petitioner.—It should seem very extraordi-
nary, that a patent should be passed, upon the *ap-
plication* of a poor, private, obscure mechanic.
Savist. 4. The employment of means for a cer-
tain end.—There is no stint which can be set to
the value or merit of the sacrificed body of Christ.

It hath no measured certainty of limits, bounds of efficacy unto life it knoweth none, but is also itself infinite in possibility of *application*. *Hoker* — If a right course be taken with children, there will not be much need for the *application* of the common rewards and punishments. *Locke*. 5. Intensity of thought; close study.—I have discovered no other way to keep our thoughts close to their business, but by frequent attention and *application*, getting the habit of attention and *application*. *Locke*. 6. Attention to some particular *thing*; with the particle *to*.—His continued *application* to such publick affairs, as may benefit his kingdom, diverts him from his pleasures. *Addison*.—This crime certainly deserves the utmost *application* and wisdom of a people to prevent it. *Addison*. 7. Reference to some case or position; as the story was told, and the hearers made the *application*.—This principle acts with the greatest force in the worst *application*; and the familiarity excited men more successfully debauches, than the exhortations of good men reforms. *Rogers*.

1.) APPLICATION, in astrology, the approach of two planets to each other.

2.) APPLICATION, in geometry, is used either in division, for applying one quantity to another, where areas, but not figures, shall be the same; or, transferring a given line into a circle, or other figure, so that its ends shall be in the perimeter of the figure.

3.) APPLICATION, in theology, is used, by some divines, for the act whereby our Saviour transfers to us, what he had earned or purchased by his holy life and death. By this application of the merits of Christ, we are to be justified, and admitted to grace and glory. Application, in the conclusion of Sermons, comprehends the importment to be made by the congregation of what they have heard.

4.) APPLICATIVE. *adj.* [from *apply*.] That which applies.—The directive command for council is in the understanding, and the *applicative* command for putting in execution, is in the will. *Bramhall* and *Hobbes*.

5.) * APPLICATORY. *adj.* [from *apply*.] That which comprehends the act of application.

6.) * APPLICATORY. *n. s.* That which applies.—There are but two ways of applying the death of Christ: faith is the inward *applicatory*, and if there be any outward, it must be the sacraments. *John's Worth's Communicant*.

7.) * To APPLY. *v. a.* [*aplico*, Lat.] 1. To apply one thing to another.—

He laid, and to the sword his throat applied. *Dryden*.

2. To lay medicaments upon a wound.—

And some speedy cure, prevent our fate,
And succour nature ere it be too late. *Addison*.

3. To make use of as remedies to every weakness, warned us of our enemy. *Rogers*.

4. To make use of as remedies to something.—This brought the memory of your father into remembrance, and I repeated the verses which I formerly applied to him.

5. To put to a certain use.—The profits there might be applied towards the support of the year. *Clarendon*.

6. To use as means to an end.—These glorious beings are in-

struments in the hands of God, who *applies* their services, and governs their actions, and disposes even their wills and affections. *Rogers*. 6. To fix the mind upon; to study; with *to*. *Locke* uses *about*, less properly.—*Apply* thine heart unto instruction, and thine ears to the words of knowledge. *Prov.* xxiii. 12.—Every man is conscious to himself that he thinks; and that which his mind is *applied about*, whilst thinking, is the ideas that are there. *Locke*.—It is a sign of a capacious mind, when the mind can *apply* itself to several objects with a swift succession. *Watts*. 7. To have recourse to, as a solicitor or petitioner; with *to*: as, I *applied* myself to him for help. 8. To address to.—

God at last.

To Satan first in sin his doom *apply'd*,
Tho' in mysterious terms, judg'd as then best.

Milton.

Sacred vows and mystic song *apply'd*,
To grisly Pluto and his gloomy bride. *Pope*. 9. To busy; to keep at work: an antiquated sense; for which we now use *ply*.—She was skillful in *applying* his humours; never suffering fear to fall to despair, nor hope to hasten to assurance. *Sidney*. 10. To act upon; to ply.

A varlet running towards hastily,
Whose flying feet so fast their way *apply'd*,
That round about a cloud of dust did fly.

Fairy Queen.

(2.) * To APPLY. *v. n.* 1. To suit; to agree.—Would it *apply* well to the vehemency of your affection that I should win what you would enjoy? *Shakespeare*. 2. To have recourse to, as a petitioner.—I had no thoughts of *applying* to any but myself; he desired I would speak to others. *Swift*. 3. To attack by way of influence.—God knows every faculty and passion, and in what manner they can be most successfully *applied to*. *Rogers*.

(3.) To APPLY, among mathematicians, sometimes signifies to transfer a line given into a circle, most commonly, or into any other figure; so that its ends may be in the perimeter of the figure. It is synonymous with *divide*, especially among Latin writers.

APPODIARE, in old records, to lean, or prop up.

APPOGGIATURA, [from *appoggiare*, Ital. to lean on,] in music, a small note inserted by the practical musician, between two others, at some distance.

* To APPOINT. *v. a.* [*appointer*, Fr.] 1. To fix any thing, as to settle the exact time for some transaction.—The time *appointed* of the father.

Gen. iv. 2. 2. To settle any thing by compact.—He said, *appoint* me thy wages, and I will pay it.

Genesis. Now there was an *appointed* sign between the men of Israel and the liars in wait. *Judges* xx.

38. 3. To establish any thing by decree.—It was before the Lord, which chose me before thy father, and before all his house, to *appoint* me ruler over the people of the Lord. 2 *Sam.* vi. 21.—Un-

to him thou gavest commandment, which he transgressed, and immediately thou *appointedest* death in him, and in his generations. 2 *Esdras* iii. 7.—O Lord, thou art the God of the just, thou hast not *appointed* repentance to the just.

Manasse's Prayer. 4. To furnish in all points;

10

to equip; to supply with all things necessary: used anciently in speaking of soldiers.—The English being well *appointed*, did so entertain them, that their ships departed terribly torn. *Hayward*.

APPOINTED, resolved. *Chauc.*

(1.) **APPOINTEE**, a foot soldier in the French army, who, long before the revolution, was entitled, for long service, and bravery, to receive pay above private sentinels. This just regulation, however, had long been suppressed, by the old government of that nation, except in the regiment of French guards, where forty appointees were still retained to each company of 150 men. Till 1670, they had also captains and lieutenants, under the appellation of *appointees*, who without residing in the regiment, received their pay! See **ANSPESSADES**.

(2.) **APPOINTEE**, in heraldry, is when two or more things are placed touching each other at the points or ends.

* **APPOINTER**. *n. f.* [from *appoint*.] He that settles or fixes any thing or place.

(1.) * **APPOINTMENT**. *n. f.* [*appointement*, Fr.] 1. Stipulation; the act of fixing something in which two or more are concerned.—They had made an *appointment* together, to come to mourn with him, and to comfort him. *Job* ii. 11. 2. Decree; establishment.—The ways of death be only in his hands, who alone hath power over all flesh, and unto whose *appointment* we ought with patience meekly to submit ourselves. *Hooker*. 3. Direction; order.—

That good fellow,

If I command him, follows my *appointment*;
I will have none so near else. *Shakespeare*.

4. Equipment; furniture.—

They have put forth the haven: further on,
Where their *appointment* we may best discover,
And look on their endeavour. *Shakespeare*.

Here art thou in *appointment* fresh and fair,
Anticipating time with starting courage.

Shakespeare.

5. An allowance paid to any man, commonly used of allowances to publick officers.

(2.) **APPOINTMENT** is also often used in the same sense with assignation.

(3.) **APPOINTMENT**, likewise, in a sense similar to the 5th explanation, above stated by Dr Johnson, (§ 1.) denotes a pension, given by princes to persons of worth, to retain them in their service. The term was chiefly used among the French, before the revolution. The kings of France gave large appointments to officers in their service. They differed from wages, in that the latter were fixed and ordinary, being paid by the ordinary treasurers; whereas, appointments were annual gratifications granted by *brevet*, for a time uncertain, and were paid out of the privy purse. These, and similar lavish expenditures of the public money, hastened the fall of the old government.

* **To APPORTION**. *v. a.* [from *portio*, Lat.] To set out in just proportions.—Try the parts of the body, which of them issue speedily, and which slowly; and, by *apportioning* the time, take and leave that quality which you desire. *Bacon*.—To these it were good, that some proper prayer were *apportioned*, and they taught it. *South*.—An

office cannot be *apportioned* out like a common and shared among distinct proprietors. *Collier*.

* **APPORTIONMENT**. *n. f.* [from *apportion*.] A dividing of a rent into two parts or portions according as the land whence it issues, is divided among two or more proprietors. *Chambers*.

APPORTUM, in old law, a revenue, or profit arising from any thing.

APPOSAL OF SHERIFFS is the charging them with money, received on their account in the exchequer, 22 & 23 Car. II.

* **To APPOSE**. *v. a.* [*appono*, Lat.] 1. To put questions to. This word is not now in use, except that, in some schools, to put grammatical questions to a boy, is called, to *pose* him; and we now use *pose* for *puzzle*.—Some procure themselves to be surprised at such times, as it is like the party that they work upon will come upon them: and to be found with a letter in their hand, or doing somewhat which they are not accustomed; to the end they may be *apposed* to those things which of themselves they are difficult to utter. *Bacon*. 2. A latinism. To apply to.—By malign putrid vapours, the nutriment rendered unapt of being *apposed* to the part. *Harvey*.

APPOSER, [from *ad*, to, and *pono*, to put] an examiner. In the court of exchequer, there is an officer called the *foreign apposer*. In the office of confirmation, in the liturgy of Edward VI. the rubric directs the bishop, or such as shall appoint, to appose a child; and a bishop examining chaplain was anciently called his *pose*. See last article.

To APPOSIN, *v. a.* To oppose. *Chauc.*

* **APPOSITE**. *adj.* [*appositus*, Lat.] Properly fit; well adapted to time, place, or circumstances.—The duke's delivery of his mind was not sharp, as solid and grave, and *apposite* to the time and occasions. *Wotton*.—Neither was Pertin, in his part, wanting to himself, either in grace and princely behaviour, or in ready and *apposite* answers. *Bacon*.—Remarkable instances of this kind have been: but it will administer reflection very *apposite* to the design of this present solemnity. *Atterbury*.

* **APPOSITELY**. *adv.* [from *apposite*.] Properly; fitly; suitably.—We may *appositely* compare this disease, of a proper and improper consumption, to a decaying house. *Harvey*.—When we come into a government, and see this place of honour allotted to a murderer, another filled with an atheist or a blasphemer, may we not *appositely* and properly ask, Whether there be any virtue of sobriety, or religion, amongst such a people. *South*.

* **APPOSITENESS**. *n. f.* [from *apposite*.] Fitness; propriety; suitableness.—Judgment is either concerning things to be known, or of things done, of their congruity, fitness, rightness, or *fitness*. *Hale's Origin of Mankind*.

(1.) **APPOSITION**. *n. f.* [*appositio*, Lat.] The addition of new matter, so as that it touches the first mass.—Urine, inspected with a microscope, will discover a black sand; where this sand sticks, it grows still bigger, by the *addition* of new matter. *Arbutnot on Diet*.—2. In grammar, the putting of two nouns in the same

case; as, *Liber Susanne matris*, the book of his mother Susan.

(2.) **APPOSITION** is used in physics, in speaking of bodies which derive their growth from the adjunction or union of neighbouring bodies. Most bodies of the fossil or mineral kingdom, are formed by *juxta-position*, or the *apposition* of parts, brought to join and adhere to each other.

APPOSITORIUM, in chemistry, a vessel made of earthen ware or glass, of a conical figure, whose biggest end receives the neck of a green retort, while the narrower is inserted into the receiver. Its use is, where a strong open fire is required, to prevent the red hot retort, by the immediate contact of its neck, from bursting the receiver.

* **TO APPRAISE**. *v. a.* [*apprecier*, Fr.] To set a price upon any thing, in order to sale.

(1.) * **APPRAISER**. *n. s.* [from *appraise*.] A person appointed to set a price upon things to be sold.

(2.) **APPRAISERS** are not a separate profession; appraising being practised by brokers of household furniture; to whom the name is chiefly applied: Upholsterers and joiners are also employed, or even any persons who are supposed to be skilled in the commodities to be appraised or valued. They are employed in cases of death, executions upon goods, or of stock to be transferred, or divided; and are called sworn appraisers, from their taking an oath to do justice between parties. They sometimes appraise on behalf of both sides, each party agreeing to have the same appraiser; sometimes in opposition, each party choosing one more of a side; and sometimes by commission or delegation of trustees, masters in chancery, &c.

APPRAISING, the act of rating, valuing, or setting a price on goods, by a person who is a competent judge, and is authorised thereto. See **APPRAISER**, § 1, and 2.

* **TO APPREHEND**. *v. a.* [*apprehendo*, Lat. to take hold of.] 1. To lay hold on.—There is nothing but hath a double handle, or at least we have two hands to apprehend it. *Taylor*. 2. To take in order for trial or punishment.—The governor kept the city with a garrison, desirous to apprehend me. *2 Cor. xi. 32.*—It was the rabble, which no body was named; and, which is more strange, not one apprehended. *Clarendon*. 3. To conceive by the mind.—The good which is given by doing, causeth not action; unless, apprehending it as good, we like and desire it. *Hooker*.

Yet this I apprehend not, why to those
Among whom God will deign to dwell on earth,

So many, and so various laws are giv'n. *Milt.*
The First Being is inviolable and incorruptible, and can only be apprehended by our minds. *Stillingfleet*.

4. To think on with terror; to fear.—From my grandfather's death, I had reason to apprehend the same; and, from my father's life, the gout. *Temple*.

* **APPREHENDER**. *n. s.* [from *apprehend*.] Conceiver; thinker.—Gross apprehenders may not think it any more strange, than that a bullet should be moved by the rarefied fire. *Glanville*.

APPREHENDRE. See **APPRENDRE**.

* **APPREHENSIBLE**. *adj.* [from *apprehend*.] That which may be apprehended, or conceived.

VOL. II. PART I.

—The north and southern poles are incommunicable and fixed points, whereof the one is not apprehensible to the other. *Brown's Vulgar Errors*.

(1.) * **APPREHENSION**. *n. s.* [*apprehensio*.] 1. The mere contemplation of things, without affirming or denying any thing concerning them.—So, we think of a horse, high, swift, animal, time, matter, mind, death, &c. *Watts*.—Simple apprehension denotes no more than the soul's naked intellection of an object, without either composition or deduction. *Glanville*. 2. Opinion; sentiments; concession.—If we aim at right understanding its true nature, we must examine what apprehension mankind make of it. *Digby*.—To be false, and to be thought false, is all one in respect of men who act not according to truth, but apprehension. *South*.—The expressions of scripture are commonly suited in those matters to the vulgar apprehensions and conceptions of the place and people where they were delivered. *Locke*. 3. The faculty by which we conceive new ideas, or power of conceiving them.—

I nam'd them as they pass'd, and understood
Their nature, with such knowledge God indu'd
My sudden apprehension. *Milton*.

4. Fear.—It behoveth that the world should be held in awe, not by a vain surmise, but a true apprehension of somewhat which no man may think himself able to withstand. *Hooker*.—

And he the future evil shall no less
In apprehension, than in substance, feel. *Milton*.

—The apprehension of what was to come from an unknown, at least unacknowledged successor to the crown, clouded much of that prosperity. *Clarendon*.—As they have no apprehension of these things, so they need no comfort against them. *Tillotson*.—After the death of his nephew Caligula, Claudius was in no small apprehension for his own life. *Addison*. 5. Suspicion of something to happen, or be done.—

I'll note you in my book of memory,
And scourge you for this apprehension. *Shakesp.*
—That he might take away the apprehension, that he meant suddenly to depart, he sent out orders, which he was sure would come into the enemies' hands, to two or three villages, that they should send proportions of corn into Basinghouse. *Clarendon*. 6. Seizure.—

See that he be convey'd unto the Tower:
And go we brothers to the man that took him,
To question of his apprehension. *Shakesp.*

7. The power of seizing, catching, or holding.—A lobster hath the chely or great claw of one side longer than the other, but this is not their leg; but a part of apprehension, whereby they seize upon their prey. *Brown's Vulgar Errors*.

(2.) **APPREHENSION**, in logic. See § 1, definition 1. Apprehension differs from *notion*, as the act of the mind, whereby a notion is formed, differs from an act of the mind, whereby we attend to a notion already formed.

(3.) **APPREHENSION** is likewise used to express an inadequate and imperfect idea: and thus it is applied to our knowledge of God, in contradistinction to comprehension.

* **APPREHENSIVE**. *adj.* [from *apprehend*.] 1. Quick to understand.—And gives encouragement to those who teach such apprehensive scholars.

Holder.—If conscience be naturally *apprehensive* and sagacious, certainly we should trust and rely upon the reports of it. *South.* 2. Fearful.—The inhabitants of this country, when I passed through it, were extremely *apprehensive* of seeing Lombardy the seat of war. *Addison.*—They are not at all *apprehensive* of evils at a distance, nor tormented with the fearful prospect of what may befall them hereafter. *Tillotson.* 3. Perceptive feeling.—

Thoughts, my tormentors, arm'd with deadly stings,

Mangle my *apprehensive* tenderest parts. *Milt.*

* **APPREHENSIVELY.** *adv.* [from *apprehensive*.] In an apprehensive manner.

* **APPREHENSIVENESS.** *n. f.* [from *apprehensive*.] The quality of being apprehensive.—Whereas the vowels are much more difficult to be taught, you will find, by falling upon them last, great help by the *apprehensiveness* already gained in learning the consonants. *Holder.*

APPRENDRE, in our ancient law books, a fee or profit to be taken or received.

(1.) * **APPRENTICE.** [*n. f. apprenti, Fr.*] One that is bound by covenant, to serve another man of trade, for a certain term of years, upon condition, that the artificer, or tradesman, shall, in the mean time, endeavour to instruct him in his art or mystery. *Cowel.*—Love enjoineh such diligence, that no *apprentice*, no, no bond slave could ever be more ready than that young prince was. *Sidney.*—He found him such an *apprentice*, as knew well enough how to set up for himself. *Wotton.*—This rule sets the painter at liberty; it teaches him, that he ought not to be subject himself servilely, and be bound like an *apprentice* to the rules of his art. *Dryden's Dufresnoy.*

(2.) **APPRENTICES, LAWS, &c. RESPECTING.** Apprentices may be bound to husbandmen, or even to gentlemen; and they, as well as tradesmen, in England, are compellable to take the children of the poor, whom the overseers, with the consent of two justices, may bind till the age of 24 years. Apprentices may be discharged, on reasonable cause; but if any, whose premium has been less than L. 20, run away from their masters, they are compellable to serve out the time of absence, or give satisfaction for it, at any period within 7 years after expiration of the original contract. Apprentices gain a settlement in that parish where they last served 40 days; and by the 5th of Elizabeth, c. 4. they have an exclusive right to exercise the trade in which they have been instructed, in any part of England. See *Blackstone's Com.* Vol. i. p. 426, &c. Anciently, benchers in the inns of court were called apprentices of the law, in Latin *apprenticii juris nobiliores*; as appears by Mr Selden's note on Fortescue: and so the learned Plowden styles himself. Sir Henry Finch, in his *Nomotechnia*, writes himself, *apprentice de ley*: Sir Edward Coke, in his *Institutes*, says, *apprenticii legis*, in pleading, are called *homines consiliarii et in lege periti*; and in another place, apprentices and other counsellors of law. Apprentices indentures and articles of clerkship, pay of duty six shillings. Parish indentures are excepted, and pay sixpence only, by 5 W. 3. c. 21. For fees given with apprentices, clerks, or ser-

vants, bound or articed by indentures, from L. 10 to L. 50, masters pay for every pound sixpence and for fees above L. 50, 1 shilling in the pound 8 Ann. c. 9.

* **To APPRENTICE.** *v. a.* [from the noun] To put out to a master as an apprentice.—

Him portion'd maids, *apprentic'd* orphans blest,

The young who labour, and the old who rest

* **APPRENTICEHOOD.** *n. f.* [from *apprentice*.] The years of an apprentice's servitude.—

Must I not serve a long *apprenticehood*

To foreign passages, and in the end,

Having my freedom, boast of nothing else

But that I was a journeyman to grief? *Shak.*

(1.) * **APPRENTICESHIP.** *n. f.* [from *apprentice*.] The years which an apprentice is to pass under a master.—In every art, the simplest there is, there is an *apprenticeship* necessary, before can be expected one should work. *Digby.*—Mr. rushed into the ministry, as being the only calling that they could profess, without serving any *apprenticeship*. *South.*

(2.) **APPRENTICESHIPS, DURATION OF.** Seven years seem anciently to have been, all over Europe, the usual term established for the duration of apprenticeships in the greater part of incorporated trades. All such incorporations were anciently called *universities*; which, indeed, is the proper Latin name for any incorporation whatever. The university of smiths, the university of tailors, &c. are expressions which we commonly meet with in the old charters of ancient towns. When those particular incorporations which are now peculiarly called universities, were first established, the term of years which it was necessary to study, in order to obtain the degree of A. B. appears evidently to have been copied from the term of apprenticeship in common trades, which the incorporations were much more ancient. As to have wrought 7 years under a master properly qualified was necessary in order to entitle any person to become a master, and to have himself apprentices in a common trade; so to have studied 7 years under a master properly qualified was necessary to entitle him to become a master teacher, or doctor (words anciently synonymous in the liberal arts, and to have scholars or apprentices (words likewise originally synonymous) study under him. By the 5th of Elizabeth, commonly called the *statute of apprenticeship*, it was enacted, that no person should for the future exercise any trade, craft, or mystery, at that time exercised in England, unless he had previously served to it an apprenticeship of 7 years at least; and what before had been the bye-law of many particular corporations, became in England the general and public law of all trades carried on in market-towns. For though the words of the statute are very general, and seem plainly to include the whole kingdom, by interpretation its operation has been limited to market-towns; it having been held, that in country villages a person may exercise several different trades, though he has not served a 7 years apprenticeship to each, they being necessary for the convenience of the inhabitants and the number of people frequently not being sufficient



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(3) APPRENTICESHIP, RE
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APPENDIX
 TABLE 1
 SUMMARY OF THE DATA
 USED IN THE STUDY
 (continued)

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APPROPRIATE. v. s. (from appropria
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To APPROPRIATE. v. s.
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To APPROPRIATE. v. s.
To approach; to draw near
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other quantity sought, without expecting to be ever able to find it exactly.

(3.) **APPROXIMATION**, in medicine, a magnetic kind of cure, or method of transplanting a disease into some other subject, whether animate or vegetable, by bringing it in immediate contact with the patient!

APPRUARE. See **APPROVER**, § 2.

APPUI, in the manege, [*n. d.* rest or stay upon the hand,] is the reciprocal effort between the horse's mouth, and the bridle-hand, or the sense of the action of the bridle on the hand of the horseman. A just appui of the hand, is the nice bearing up or stay of the bridle, so that the horse, being awed by the sensibility and tenderness of his mouth, dares not rest too much upon the bit-mouth, nor check or beat upon the hand to withstand it. A horse is said to have no appui, when he is too apprehensive of the hand, and cannot bear the bit. He is said to have too much appui, when he rests or throws himself too much upon the bit. Horses designed for the army ought to have a full appui upon the hand. To give a horse a good appui, he should be galloped, and put often back.

(1.) * **APPULSE**. *n. f.* [*appulsus*, Lat.] The act of striking against any thing.—An hectic fever is the innate heat kindled into a destructive fire, through the *appulse* of saline steams. *Harvey*.—In vowels, the passage of the mouth is open and free, without any *appulse* of an organ of speech to another: but, in all consonants, there is an *appulse* of the organs. *Holder*.

(2.) **APPULSE**, in astronomy, the approach of any planet to a conjunction with the sun, or a star. It is a step towards a transit, occultation, conjunction, eclipse, &c. M. Flamsteed, M. de la Hire, and others, have given observations of the moon's appulses to the Pleiades.

(3.) **APPULSE OF CATTLE**, in the civil law, the right of driving them to water.

APPURTENANCES, or **APPERTINANCES**, in common law, things belonging to some other as their principal. Appurtenances may either be things corporeal, as hamlets belonging to a chief manor; or incorporeal, as liberties and services of tenants. See **APPENDANT**, § 1. Def. 3.

APREMONT, a town of France, in the department of Vienne. Long. o. 38. W. Lat. 46. 45. N.

* **To APRICATE**. *v. n.* [*apricor*, Lat.] To bask in the sun. *Di8.*

* **APRICITY**. *n. f.* [*apricitas*.] Warmth of the sun; sunshine. *Di8.*

* **APRICOCK**, or } *n. f.* [from *apricus*, Lat.]

(1.) * **APRICOT**. } *funny*.] A kind of wall fruit.

(2.) **APRICOT**, in botany. See **PRUNUS**.

(3.) **APRICOT WATER**. To a quart of water, put six or eight apricots sliced, and the kernels bruised; boil the whole, to extract the taste; and when cold, add four or five ounces of sugar. When that is dissolved, strain it.

APRIES, or **PHARAOH HOPHRAH**, the son of Psammis, king of Egypt; prophesied against by Jeremiah and Ezekiel. He oppressed his subjects, and Sidon, and some say he put Jeremiah to

1. He thought neither God nor man could

dethrone him; which, however, was easily done by Amasis, and he himself was strangled. See **AMASIS**.

(1.) * **APRIL**. *n. f.* [*Aprilis*, Lat. *Avril*, Fr.] The fourth month of the year, January counted first.—*April* is represented by a young man green, with a garland of myrtle and hollyhock buds; in one hand primroses and violets, in the other the sign Taurus. *Peacocks on Dressing*. Men are *April* when they woo, December when they wed: Maids are May when they are married, but the sky changes when they are wives. *Shakespeare*. As you like it.

(2.) **APRIL** is the 2d month according to the computation of astronomers. It contains 30 days.—The word is derived from *aperio*, to open: because the earth, in this month, begins to open her bosom for the production of vegetables. In this month the sun travels through the sign Taurus.

A PRIORI, a kind of demonstration. See **DEMONSTRATION**.

APRIZE, adventurer. (*Obs.*) *Sailey*.

(1.) * **APRON**. *n. f.* [A word of uncertain etymology, but supposed by some to be contracted from *apron* one.] A cloth hung before, to keep the other dress clean.

Give us gold, good Timon; hast thou more?

Hold up, you sluts,

Your aprons mountant.

The nobility think scorn to go in leather aprons.

How might we see Falstaff, and not ourselves be so?—Put on two leather jerkins and aprons, and wait upon him at his table as drawers. *Shakespeare*.—These figures the vest is gathered up before the like an apron, which you must suppose filled with fruits. *Addison*.

(2.) * **APRON**. [in gunnery.] A piece of leather which covers the touch-hole of a great gun.

(3.) **APRON**, in naval architecture, is a piece of curved timber fixed behind the lower part of the stern, immediately above the foremast and the keel. Apron is also a name given to a platform or flooring of a plank, raised at the entrance of a dock, against which the dock gates are shut.

(4.) * **APRON-MAN**. *n. f.* [from *apron* and *man*.] A man that wears an apron; a workman; a manual artificer.—

You have made good work,

You and your apron-men, that stood so much

Upon the voice of occupation, and

The breath of garlick eaters.

(5.) * **APRON OF A GOOSE**. The fat skin which covers the belly.

* **APRONED**. *adj.* [from *apron*.] Wearing an apron.—

The cobbler aproned, and the parson gown'd.

APSE, a small town, in the isle of Wight, near Medina.

APSIDES. See **APSIS**, § 3.

APSINTHATUM, in physic, a kind of preparation to strengthen the stomach. See **ABSINTHUM**.

APSIRTIDES. See **ABSURTIDES**.

(1.) **APSIS**, [Ψ , Gr. or *apsis*, Lat.] The arched roof of a house, room, or oven, &c. also the ring or compass of a wheel.

(2.) **APSIS**, in ecclesiastical writer, denotes a

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 peeling to be definite thing; which, however
 by Ananda, and he lived as he
 was. a woman-
 1941.

(1.) * **APRIL** is the fourth month of the year. The fourth month of the year is first—April is represented by green, with a picture of a tree with a bird in one hand and a branch in the other. The first Tigris Ancestral Men are April when they were first they were Men are May and the fly changes what the

2.) **APRIORI** is the 2d word in computation of abovecon. her-
- The word is derived from
- evaluate the earth, in this word, is
her bottom for the problem of
This month the fun begins through
A PRIORI, a kind of forecast
MONSTRATION.
APRIZE, adventure. (19) b
(1.) **APRON** = a. a. apron dress
logy, but supported by time inter-
- character. A cloth hung be-
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(4)* *Arson-max.* *Affron* *max.*
that which occurs as arson. *v.* *re-*
All artificers. *You have not*
more, the

You and your spouse
 Upon the voice of acquiescence
 The breath of pink roses
 (5.) * Atoned as a Court is
 covers the body
 * APPROVED, as first
 apron
 The collar apron's, with it

APRUS.
part of water,
and the kernels
and the taste;
pieces of sugar

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amount to the same with their, *capas*, *capas*, and *perforatus* and hands opened to the body of the church. The word is more properly used for the bishop's throne, in ancient churches, called *apli gradas*, because raised on above the ordinary seats.—It was also denominated *sedes*, and in later times *tribuna*. *Aplic* is not a reliqua, or safe wherein the relics were anciently kept, which was usually of leaden. The prefix was commonly

in the altar: it was usually of wood, but sometimes of gold and silver, with sculptures, as, "ΑΡΑΞ, α. - *apēx*, plural, *apēxēs*," as in astronomy to two points in the celestial sphere, to which they are at the greatest, least distance from the sun or earth. The highest is more particularly denominated *aphelion*, the lower, perihelion, or perihelion. If bodies revolve in orbits that are near circles, and the *apēx* of their orbit, then the centripetal forces of those orbits will be reciprocally as the squares of the

APLEY, a village in Suffex near Ramber.
 ASSORUS. See ASSORUS.
 ASTECHIA, (from = privative, and *techo*, for
 medicine, a swooping or fainting away, c.
techo; and *astechia*.
 ASTYCTOS, from = and *tycho* to cool,) was
 used by the ancients, as the name of a flower for
 the purple, and of the colour of iron. the aus-

which they say was, that when once heated, it would never grow cold again. To see that this is an impossibility, and the errors among the ancients, and misfindings of their works by later writers, have been the occasion for propagating so idle an opinion. We have some Runes indeed in England, and in one heated, will retain a warmth a

and all the other accounts seem grounded on a warming stone, used in Cornwall and Yorkshire to lay at the feet of people's beds, will give warmth 3 or 10 hours; and there is a furnace cut out of the falt mountains near Constantinople, and warmed into broad tiles called *raggias*, and the *isphans*, which being once well heated retain a sensible warmth 26 hours; but the

PSYLLIUM, in the materia medica of the Arabs, a name given to the common *marrubium* or horehound, a plant at that time, as well as now, good in coughs, and other complaints of the throat.

After they are through the eager-
 affection; after through a natural inclina-
 tion; after through sundry opportunities.
 Finally, after through a singular delig-
 hts they are in giving very large and partic-
 ularly once how all near about them find

Vol. II, Part I.

329 } A P T

do otherwise than they do. *Hooker*.—
preaches on my best south walks were
a foot or faintly upon their leavens
Temple. 3; Inclined to; led to, d
You may make her you love, believe
warrant, she is apter to do, than con
Shake. As you like it.—Men are ap
of themselves, and of their nation,
rage and strength. *Temple*.—One
these lights, &c. *Temple*.—One, b

4. Ready & quick. *as, an apt wit.*
I have a heart as little *apt* as you.
But yet a brain that leads my life.
To better variety.

5. Qualified for.—These brothers loved the king in war, whereunto the

(2.) ART, or ARTS, in ancient topography, the name of the mountains of the Rhodanthe Calvion, 30 miles N. of Aix, 52 N. of Nyon, and 25 S. E. of Orange. Its composition is prunice, coarse ferges and was for which it has a great reputation. It is

ly called *Arta Julia*. In the Noted *Crataegus Apioniflora* Pliny reckons the Latin towns. That it was a Roman appears from an inscription on a stone Arica. Long, 5. 56. E. Lat 43. 23.

⁴ To Apt. v. a. (opere, Lat.) 1. T. dapt—

We need a man that knows the

Of history and how to *apt* their place
Where brevity, where splendour,
Where sweetness is required, and where
In some pounds, *apt* for it by nature
come pilks.

APT—To *aptate* a planet, is to strengthen its position of house and dignities to its advantage, in order to bring about

(1) **APTERA**, a classical name, (from *aptes*, and *pteron*, a wing,) used by Linnaeus in the 7th order of insects, comprehending all wingless. It consists of 14 genera and Hübner divides this order into two classes

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2. **AST2**

2. **APTERA PODARIA**, insects, which have limbs, but no wings.

(II.) **APTERA**, an ancient town of Lycia.

(III.) **APTERA** } a town of Crete, (whose port
APTERIA, or } was Cifamus, on the W. side
APTERON, } of the island, 12 miles S. of
 Sidon, towards the Montes Leuci, and as many
 from the Sinus Amphimales. Stephanus says, it
 was so called from the Sirens, who, being there
 vanquished in song by the Muses, stript themselves
 of their wings, and out of grief leaped into the
 sea! Long. 25. 0. E. Lat. 35. 50.

APTHANE, a title anciently given to the higher degrees of nobility in Scotland. See **ABTHANES** and **THANE**.

(I.) * **APTITUDE**. *n. f.* [French.] 1. Fitness.—This evinces its perfect *aptitude* and fitness for the end to which it was aimed, the planting and nourishing all true virtue among men. *Decay of Piety*. 2. Tendency.—In an abortion, the mother, besides the frustration of her hopes, acquires an *aptitude* to miscarry for the future. *Decay of Piety*. 3. Disposition.—He that is about children, should study their natures and *aptitudes*, what turns they easily take, and what becomes them; what their native stock is, and what it is fit for. *Locke*.

(2.) **APTITUDE**, or **APTNESS**, is often used, in speaking of the talents of the mind, for a promptitude, or disposition to learn things with ease and expedition. In which sense *aptness* amounts to the same with what the Greeks call *ὑπότης*, *bona indoles*, and we sometimes stile *docility*. Charlton divides *aptness* into 3 parts, viz. *acuteness*, *sagacity* and *memory*.

* **APPLY**. *adv.* [from *apt*.] 1. Properly; with just connection, or correspondence; fitly.—

That part

Was *aply* fitted, and naturally perform'd.

Shakes.

But what the mass nutritious does divide?

What makes them *aply* to the limbs adhere,
 In youth encrease them, and in age repair?

Blackmore.

2. Justly; pertinently.—Irenæus very *aply* remarks, that those nations, who were not possessors of the gospels, had the same accounts of our Saviour, which are in the Evangelists. *Addison*. 3. Readily; acutely; as, he learned his business very *aply*.

* **APTNESS**. *n. f.* [from *apt*.] 1. Fitness; suitability.—The nature of every law must be judged of by the *aptness* of things therein prescribed, unto the same end. *Hooker*.—There are antecedent and independent *aptnesses* in things; with respect to which, they are fit to be commanded or forbidden. *Norris's Miscellanies*. 2. Disposition to any thing; of persons.—The nobles receive so to heart the banishment of that worthy Coriolanus, that they are in a ripe *aptness* to take all power from the people. *Shakes.* 3. Quickness of apprehension; readiness to learn.—What should be the *aptness* of birds, in comparison of beasts, to imitate speech may be enquired. *Bacon*.—4. Tendency; of things.—Some seeds of goodness give him a relish of such reflections, as have an *aptness* to improve the mind. *Addison*.

* **APTON-COMB**, a small town in the Isle of Wight, near Medina.

* **APTOTE**. *n. f.* [of *a* and *τμήσις*.] A noun which is not declined with cases.

APTOTON. See last article.

(I.) **APUA**, in ichthyology, the name of a small sea-fish, supposed by many to be produced by the slime and mud of the shores. But all such opinions are groundless. There are two species of this fish: viz..

1. **APUA PHALERICA**; and

2. **APUA VERA**.

(II.) **APUA MEMBRAS**, in ichthyology, a name by which some have called the pilchard.

APUEIS, a nation of Indians, in Brazil

APULEIUS, Lucius, a Platonic philosopher, universally known by his performance of the Golden Ass. He lived in the 2d century, under the Antonines; and was born at Madaura, a Roman colony in Africa. He studied first at Carthage, then at Athens, and afterwards at Rome, where he learned the Latin tongue without the help of a master. He was a man of an inquisitive disposition, especially in religious matters: this prompted him to take several journeys, and to enter into several different societies of religion. He spent his whole fortune almost in travelling so that, at his return to Rome, when he was about to dedicate himself to the service of Oris, he had not money enough to defray the expense attending the ceremonies of the reception, and was obliged to pawn his clothes to raise the necessary sum. He supported himself afterwards by pleading causes; and as he was a great master of eloquence, and of a subtle genius, many considerable causes were trusted to him. But he availed himself more by a good marriage than by his pleadings: a widow named *Pudentilla*, who was neither young nor handsome, but wanted a husband and was very rich, took a great fancy to him. This marriage drew upon him a troublesome law-suit. The lady's relations, pretending he made use of sorcery to gain her heart and money, accused him of being a magician before *Claudius Maximus* preconsul of Africa. Apuleius was under no great difficulty of making his defence. As *Pudentilla* was determined from considerations of health, to enter upon a second marriage, even before she had seen this pretended magician, his youth, deportment, pleasing conversation, vivacity, and other agreeable qualities of Apuleius were charms sufficient to engage her heart. He had the most favourable opportunities of gaining her friendship, for he lodged some time at her house: *Pudentilla*'s eldest son, having a great friendship for him, was likewise desirous of the match, and solicited him in favour of his mother. * Do you make a wonder (said Apuleius, in his defence) that a woman should marry again, after having lived a widow 13 years? it is much more wonderful that she did not marry again sooner. You think that magic must have been employed to prevail with a widow of her age, to marry a young man; on the contrary, this very circumstance shows how little occasion there was for magic." He offered to prove by his marriage contract, that he got nothing of *Pudentilla* but a promise of a very moderate sum, in case he survived her and had children by her. He was also obliged to make such confessions in court as *Pudentilla*

would gladly have excused. He said she was neither handsome nor young, nor such as could any ways tempt him to have recourse to enchantments: and he added, that Pontianus her son proposed the marrying his mother to him only as a burden, and the action of a friend and philosopher. He also took notice of many inconveniencies which attend the marrying of widows, and spoke highly of the advantages of a maid above a widow: "A handsome virgin (said he,) let her be ever so poor, abundantly portioned; she brings to her husband a heart quite new, together with the flower and first fruits of her beauty. It is with great reason that all husbands set so great a value upon the flower of virginity: all the other goods which a woman brings her husband are of such a nature, that he may return them again, if he has a mind to be under no obligation to her; that alone cannot be restored, it remains in the possession of the first husband. If you marry a widow, and she loves you, she carries away all that she brought you." The apology is still extant, and is reckoned a very fine piece. Apuleius was indefatigable in his studies; and composed several books in verse and prose; but most of them are lost. He took great pleasure in declaiming, and was heard generally with great applause: When he declaimed at Oeca, the audience cried out with one voice, that they ought to confer upon him the honour of citizen. The citizens of Carthage heard him with great satisfaction, and erected a statue to him; and several other cities did him the same honour. Several critics have published notes on Apuleius's Golden Ass, and there have been translations of it into different languages.

APULI, the ancient people of APULIA.

APULIA, now called PUGLIA, a territory of Italy, bordering on the Adriatic, and extending from the river Frenio to Tarentum in length, and from the Adriatic to the Lucani in breadth. It was divided into,

(1.) APULIA DAUNIA, now called Puglia Pinna, or the Capitanata; and,

(2.) APULIA PEUCETIA, now Terra di Barri. It abounded in sheep, which yielded the finest wool. It is now the east side of the kingdom of Naples.

APURIMA, or APORAMAC, a rapid river of Peru, in S. America, 30 miles from the river Amazon.

APURWACA, a river of Guiana, in S. America.

(1.) APUS, AVIS INDICA, in astronomy, a constellation of the southern hemisphere placed near the pole, between the *triangulum australe* and the Camelion, supposed to represent the bird of paradise.

(2.) APUS, in entomology, a species of the *monogamus* genus of insects.

(3.) APUS, in ornithology, a species of the swallows.

APUTTASY, in botany, a name given by the people of Guinea to a tree, a decoction of which is greatly used among them, for washing the mouth to cure the scurvy in the gums, and preserve the teeth. *Phil. Trans.* No. 237.

(1.) APYCNI, in ancient music, was used for such chords or sounds of the scale, as could never enter the *spissum*. They were *stabiles*, or fixed.

(2.) APYCNI SUONI, in music, sounds distant one or more octaves, and yet concord.

APYCNON, [from *α* and *πυκνός*,] *non spissimum, rarum*, in ancient music, was applied to those two conjunct intervals of a tetrachord, which taken together were greater than the third. This happened only in the two diatonic genera.

APYCNOS, in music, is said of the diatonic genus, on account of its having spacious intervals, in comparison of the chromatic and enharmonic.

APYRENOS, properly signifies without kernels. The Greek writers, however, did not always keep strictly to this sense of the word, but sometimes applied it to such fruits as had fewer and softer kernels than others of the same kind.

APYREXY, in medicine, [from the privative *α*, and *πύρ*, heat,] the intermission of a fever, or ague.

APYROI, in antiquity, a denomination given to altars, whereon sacrifice was offered without fire.

APYROMETALLUM, in metallurgy, a name by which some authors have called gold, from its resisting the force of fire.

APYRON, something that has not undergone the fire. In this sense, *sulphur vivum*, or native sulphur, is particularly denominated *apyron*.—Some authors also give the denomination *apyron* to a modern process for making *æthiops mineral*, without fire, by trituration alone.

APYROUS, a word applied to denote that property of some bodies, by which they resist the most violent fire without any sensible alteration. Apyrous bodies ought to be distinguished from those which are *refractory*. Refractory substances are those which cannot, by violent heat be fused, whatever other alteration they may sustain. But a body, properly speaking, apyrous, can neither be fused by heat, nor can undergo any other change. Diamonds were long thought to be possessed of this property. But some late experiments have shown, that diamonds may be entirely dissipated or evaporated by heat, and are therefore not intitled to be ranked among apyrous substances. Perhaps there is no body in nature essentially and perfectly apyrous. But it is sufficient that there be bodies apyrous relatively to the degree of fire which art can produce, to intitle them to that name.

(1.) * AQUA. *n. s.* [Latin.] A word signifying Water, very much used in chymical writings.

(2.) AQUA is by some supposed to be compounded of *a* and *qua*, i. e. *from which*; alluding to the opinion that water is the basis of all bodies. The word frequently makes part of the name of medicines, and other menstrua, which though in a liquid form, possess powers and qualities very different from those of water: such as,

AQUA ALEXITERIA, } for all which, see
AQUA ALUMINOSA, &c. } PHARMACY, if not among the following articles, or not fully treated of, in their order.

AQUA APPIA. See AQUEDUCTS, § 4.

AQUA CÆLESTIS, among chemists, rectified wine.

AQUA CHRYSULCA, a subtle kind of *aqua regia*, called also *aqua pugilum*. Three parts of *sal ammoniac*, and two of nitre, injected into a tubulated retort made red hot, yield this acid compound spirit.



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filling crude nitre with calcined vitriol, equal parts. The nitrous acid, expelled by the vitriolic, will rise in red fume, and pass into the receiver. The vitriolic acid, uniting with the alkaline basis of the nitre, forms vitriolated tartar; but, there being more vitriolic acid, than is requisite to saturate the alkali, the surplus rises with the nitrous acid: aquafortis, therefore, is a mixture of these two acids. It may also be made by distilling crude nitre, with somewhat more than half its weight of oil of vitriol; or by mixing one part of oil of vitriol with nine parts pure spirit of nitre. See **NITROUS**, and **CHEMISTRY, INDEX**.

AQUAGE, or } a water course.
AQUAGIUM, }

AQUA JULIA. See **AQUEDUCTS**, § 4.

AQUALICULUS, in anatomy, a name given to the region of the body, wherein the neck terminates, and the thighs commence, and in which also the privities are placed. It is the same with what others call *pubes*, others the *hypogastrium*, *fumen*, *imus venter*, &c. See **ANATOMY**, § 265—323.

AQUA MARINA, of the Italian lapidaries, is of a sea or bluish green. This stone seems to be the beryllus of Pliny. *Woodward*.

AQUA MARINA, the name by which the lapidaries call the beryl. See **BERYL**.

AQUA MARTIA. See **AQUEDUCTS**, § 4.

AQUAMBOE, one of the greatest kingdoms on the coast of Guinea in Africa, stretching 20 miles in breadth, and ten times that space in length from E. to W. According to Bosman, the coast is divided into a great number of petty republics, but all of them subject to the king of Aquamboe, who indiscriminately uses an unlimited authority over them and the meanest of his subjects. His despotism gave rise to a proverbial saying, that, "there are only two ranks of men at Aquamboe; the *royal family*, and *slaves*." The natives of this country are haughty, turbulent, and warlike; and their power is formidable to all the neighbouring nations. They grievously oppress such nations as are tributaries to the king of Aquamboe, entering their territories by troops, and carrying off from the inhabitants whatever they think proper; nor do they ever meet with opposition from the inhabitants, as they are sensible the king would not fail to resent this as indignity offered to him.

AQUA MERCURIALIS, a preparation of aqua regia, and sublimate of mercury, with a little mercury, placed in a sand heat, till the solution of the mercury be made. It is a mark of perfection of the aqua mercurialis, if it turn a piece of copper cast into it, of a silver colour. It is by this water that the alchemists pretend, all metalline bodies may be reduced to their first matter, or mercury.

AQUA MIRABILIS. [Latin.] The wonderful water, is prepared of cloves, galangals, cubebs, mace, cardomums, nutmegs, ginger, and spirit of wine, digested twenty-four hours, then distilled.

AQUA NAPHÆ, is a name given to the distilled water of orange flowers.

AQUANEGRA, or } A small town in Italy, in
AQUA-NIGRA, } the Mantuanese, seated on
the Chiese, a little above its junction with the Oglio,

22 miles W. of Mantua. It belongs at present to the house of Austria, but how long it may continue so, we will not venture to prophecy. Long. 30. 5. E. Lat. 45. 7. N.

AQUA OMNIUM FLORUM, in pharmacy, signifies the distilled water of cows-dung, when they are at grass. Some also call cows urine by this name; and, in English, all-flower-water!

AQUAPOISE, [from *aqua*, and *poids*, Fr. weight,] an instrument for examining the weight of liquors.

AQUA PUGILUM. See **AQUA CHRYSULCA**.

(1.) **AQUA REGIA**, or **AQUA REGALIS**. [Lat.] An acid water, so called because it dissolves gold, the king of metals. Its essential ingredient, is common sea salt, the only salt which will operate on gold. It is prepared by mixing common sea salt, or sal ammoniac, or the spirit of them, with spirit of nitre, or common aqua fortis. *Chambers*.—He adds to his complex idea of gold, that of fixeness or solubility in *aqua regia*. *Locke*.

(2.) **AQUA REGIA** is composed of nitrous and marine acid, in different proportions according to the purpose for which it is intended. When made with sal ammoniac, the common proportion is one part of this salt or four parts of nitrous acid; but to dissolve platina, equal parts are requisite. A purer aqua regia may be made by simply mixing the two acids. Aqua regia likewise dissolves all other metals, except silver. The gold dissolved in aqua regia is, in fact, dissolved in the dephlogisticated marine acid only, which, being deprived of its phlogiston by the nitrous acid, recovers it from the gold, and thus renders gold soluble; for metals are not soluble in acids until they lose a part of their phlogiston. See **CHEMISTRY, INDEX**.

AQUARIA. See **AQUATIA**.

AQUARIANS, 1. Christians in the primitive church who consecrated water in the eucharist instead of wine. This they did under pretence of abstinence, or, because they thought it universally unlawful to eat flesh or drink wine. Epiphanius calls them *Encratites*, from their abstinence; St Austin, *Aquarians*, from their use of water; and Theodoret, who says they sprang from Tatian, *Hydroporostate*, because they offered water instead of wine. 2. There was another sort of Aquarians, who did not reject the use of wine as unlawful; for they administered the eucharist in wine at evening service; but, in their morning assemblies, they used water, for fear the smell of wine should discover them to the heathens.

AQUARIUS, the **WATER-CARRIER**, in astronomy, the 11th sign in the zodiac, reckoning from Aries; from which also the 11th part of ecliptic takes its name.—The sun moves through Aquarius in the month of January; it is marked thus, ♒ by astronomers. The poets feign, that Aquarius was Ganymede, whom Jupiter ravished under the shape of an eagle, and carried away into heaven, to serve as a cup bearer, in the room of Hebe and Vulcan; whence the name.—Others hold, that the sign was thus called, because, when it appears in the horizon, the weather usually proves rainy. The stars in this constellation, in Ptolemy's catalogue, are 45; in Tycho's 41; in Hevelius's 47; in Flamsteed's 108.

AQUARTIA,

AQUARTIA, in botany, a genus of the tetandria monogynia class. The calyx is campanulated; the corolla is rotated, with linear divisions; and the berry is four-seeded. There is but one species; viz.

AQUARTIA ACULEATA, a native of America.

AQUA SECUNDA, aquafortis much diluted with pure water. It is employed in several arts, to clean the surface of metals and certain stones, and for various other purposes.

AQUA SICCA PHILOSOPHORUM, a cant term, invented by some alchemists for the flowers of zinc, called by several other as unmeaning names, by these writers; as *sericum*, philosophic cotton, and *talc*. A preparation of these flowers, by means of vinegar, has also been called oil of talc, and many great properties ascribed to it; but it is truly no other than the oil of the grape, from which the vinegar was made, and has no title to any thing that has been said of it.

AQUA SULPHURATA, sulphur water, a new name for what was originally called *gas sulphuris* by Van Helmont. See *GAS*.

AQUA TETRACHYMAGOGON, water purging the four humours of the body! *Bailey*.

AQUATIA, in writers of the middle age, a right of fishing three days in the year. In ancient deeds we find divers grants of this privilege of aquatia, AQUATURA, or AQUARIA. In some writings aquatia also signified a fee, or service, paid for the privilege of fishing.

AQUATIC, or } See next article.
AQUATICAL.

* **AQUATICK**. *adj.* [*aquaticus*, Lat. from *aqua*, water.] 1. That which inhabits the water.—The vast variety of worms found in animals, as well terrestrial as *aquatick*, are taken into their bodies by meats and drinks. *Ray on the Creation*.—Brutes may be considered as either aerial, terrestrial, *aquatick*, or amphibious. *Aquatick* are those whose constant abode is upon the water. *Locke*. 2. Applied to plants, that which grows in the water.—Flags, and such like *aquaticks*, are best destroyed by draining. *Mortimer's Husbandry*.

AQUATICUM, in writers of the middle age, a thing diluted with water.

* **AQUATILE**. *adj.* [*aquatilis*, Lat.] That which inhabits water.—We behold many millions of the *aquatile* or water frog in ditches and standing plashe. *Brown's Vulgar Errors*.

AQUATILES DII, in the mythology, aquatic gods; such as Neptune, Amphitrite, the Tritons, Naiads, &c.

AQUATINTA, a method of etching on copper, lately invented, and by which a soft and beautiful effect is produced, resembling a fine drawing in water colours or Indian ink.—Previous to the operation upon the plate, the following powder must be prepared. Take equal parts of asphaltum and fine transparent rosin, and powder them separately in a mortar. Sift through a muslin sieve, upon a sheet of paper a thin stratum of the asphaltum, above which sift a similar layer of the rosin, and upon this another layer of the asphaltum, continuing these alternate layers till both of the powders are exhausted. Then pass the mixture both together through the same sieve so mix them sufficiently for use. Some, instead

of the above mixture, use powdered gum sandarach only. A copper plate being polished in the usual way, lay the etching ground upon it, and etch the outlines of the design in the manner directed under the article *ETCHING*. Then soften the ground with grease, and wipe it off with a rag, leaving as much grease upon the plate as just to dim the copper. Next sift the powder upon the surface of the plate; after which, strike the other side of it pretty smartly against the edge of a table to discharge it of the loose powder. Then hold the back of the plate with a hand-vice over a chaffing-dish of burning charcoal, till it become so hot as to give pain upon being touched with the back of the hand; and the powder which adhered to the grease will now be fixed to the plate. The plate being then suffered to cool, take turpentine varnish mixed with ivory black; and with a hair pencil dipt in it, cover all the lights or places where there is no work or shade. A border of bees wax is now to be raised round the plate; and having diluted a quantity of aquafortis to a proper weakness with water, pour it on, and let it stand 5 minutes for the first or lightest shade; after which, pour it off; and having washed the plate with water, set it edgewise to dry. Then with varnish stop out all the light shades, pour on the aquafortis for the second tint, and let it stand 5 minutes more; proceeding in the same manner for every tint till you produce the darkest shades. If a bold open ground is wanted in any part, this requires an after operation. The ground must be laid as in the other case, by sifting on the powder; only this powder must be much coarser, and the plate more heated, that the particles of the powder may spread, and form small circles: good clean rosin will do by itself. In etching landscapes, the sky and distant objects are also performed by a second operation, and the powder is sifted upon the plate with a finer sieve. If the trees or any part of the fore ground require to be finished higher, the plate must be entirely cleaned from grease with bread, and a ground laid in the common way of etching; when the plate may be finished as highly and neatly as possible with the needle or point, by stippling with dots, and biting in those parts, or by a rolling wheel, which is more expeditious. If different colours are to be expressed in aquatinta, there will be required so many different plates, each having only that part etched upon it which is designed to be charged with its proper colour. It may happen, in particular subjects, that some of the colours are so distant from each other, as to allow the printer room to rub them in without blending; in which case, two or three different colours may be printed from the same plate at once. Where different plates are necessary, a separate one, having a pin in each corner, must be provided as a sole or bottom to the aquatinta plates; and these again must be exactly fitted, having each a small hole in their corners for passing over the pins of the sole: the said pins serving the double purpose of retaining the plates successively in their due position, and of directing the printer in placing the paper exactly on each plate so as not to shift; by which means each tint or colour will be exactly received on its proper place. This is the method practised

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See AQUA
"AE. [Latin.]
it is otherwise
ther simple or
some appropriate
eared from wine, or the grape; a-
that draws after the same manner
thunder;—) will rather trust a Flo-
ry better, as Irishman with my aqua-
or a thief to walk with my ambling
as my wife with herself. *Shadyfoote*.
TRADUCA, CROSTEA, a form of me-
the London Pharmacopoeia, made in the
summer: take blue vitriol, 3 oz. alum
of spirit of oil of vitriol, of each 3 oz.
a pint and a half; boil the salts in water
are dissolved, and then add the oil of vi-
and finally strain the whole through paper.
QUAYVA, a town of the kingdom of Na-
and province of Barri.

See AQUA, N° 2 and AQUEDUCT, N° 1.
AQUEDUCT, in anatomy, a bony kind of
or passage, in the os petriose, supposed to
serve to the purpose of hearing.—It is called
not only on account of its form, but, as
it also imagine, from its serving to discharge
foreign matters collected in the inner cavities
of the ear.—It is sometimes also called *aqueductus*
from Fallopius, its first discoverer.—See
Fallopius and confirm it with the *tabula Eustachiana*.
Aqueduct is sometimes also called *meatus*; con-
firmed by others *meatus carotidis*, *meatus capiti*,
meatus auditorius internus, *foramen auditori-*
um and *hydraspargium*. See ANATOMY,
p. 136.

AQUEDUCT n. f. [*aqueductus*, Lat.] A
device made for carrying water from one
place to another; made on uneven grounds, to
give the level of the water, and convey it by a
pipe.

Some aqueducts are under ground, and o-
thers above it, supported by arches.—Among the
ancients the grandeur of the com-
munications was still chiefly in temples, high-
ways, aqueducts, walls, and bridges of the city.

Neither the rules of water are conveyed
in various aqueducts, by nature laid
to carry all the labour. *Blackm.*

AQUEDUCTS, DIFFERENT KINDS OF. Ar-
chitects distinguish two kinds of aqueducts; the

nels are cut with an imperceptible descent, that
the current may be accelerated by its own weight.
Parallel to its course, on each side, is cut a nar-
row foot path, where people may walk when ne-
cessary. By conduits, or grooves, the waters are
conveyed into large cisterns, but not forced above
their original level. To make them rise and issue
from their apertures with force, they must be
confined in tubes of a small diameter, and abrupt-
ly fall from a considerable declivity.

(2.) AQUEDUCTS, IMMENSE EXTENT OF THE
ANCIENT. Aqueducts of every kind were long
ago the wonders of Rome, the vast quantity of
them which they had, the prodigious expense
employed in conducting waters over arides from
one place to another, at the distance of 100, 400
60, and even 100 miles, which were either con-
tinued or supplied by other labours, as by cutting
mountains and piercing rocks; all this may well
surprise us; nothing like it is undertaken in our
times: we dare not purchase convenience at so
dear a rate. Appian Claudius the censor advised
and constructed the first aqueduct. His example
gave the public luxury a hint to cultivate these
objects, and the force of prodigious and indefat-
igable labour diverted the course of rivers and
bonds to Rome. Agrippa, in that year when he
was consul, put the last hand to the magnificence
of these works. It is chiefly in this respect that
the modern too much resembles the ancient city of
Rome. For this advantage, he is peculiarly in-
debted to Sextus V. and to Paul V. who for
grandeur and magnificence emulated the masters
of the universe. There are still to be seen, in dif-
ferent places contiguous to Rome, striking remains
of these aqueducts; arches continued through a
long space, over which were extended the canals
which carried the water to the city. The arches
are sometimes low, sometimes raised to a vast
height, to humour the tumidities or depressions
of the ground. There are 6, which have two
arcades, one constructed above the other, and this
precaution was observed, lest the height of a single
arcade, if extended as far as the situation requir-
ed, might render the structure less firm and per-
manent.



manent. They are commonly of bricks; which by their cement cohere so strongly, that the parts are not separated without the utmost difficulty—When the elevations of the ground were enormous, it became necessary to form *subterraneous* aqueducts. These carried the waters to such aqueducts as were raised above ground, in the declivity or at the foot of mountains. If the artificial channel of the water was not susceptible of a downward bias but by passing through a rock, a passage was cut through this, at the same height with the superior aqueduct: such an one may be seen above the city of Tivoli, and at the place called *Vicavaro*. The canal which formed the course of the aqueduct is hewn out of the rock to the extent of more than a mile, about 5 feet in height and 4 in breadth. One singularity deserves peculiar notice. These aqueducts, which might have been directed in a straight line to the city, did not arrive at it but by frequent and winding mazes. Some have said that this oblique tract was pursued to avoid the expence which must attend the building of arcades to an extraordinary height: others, that it was their intention to diminish the impetuosity of the current; which, rolling in a straight line through an immense space, must always have increased its velocity, must have worn the canals by perpetual and forcible attrition, and of consequence afforded an impure and unwholesome draught to the inhabitants. But since there was so great a descent between the cascade of Tivoli and Rome, it is demanded why they should go to draw water from the same river at the distance of more than 20 miles higher; nay, of more than 30 miles, if we reckon the curvatures of its direction through that mountainous country? It is replied, the motive of obtaining the water more salubrious, and more limpid, was sufficient to make the Romans think their labour necessary, and their expence properly bestowed; and to those who reflect that the waters of this river were impregnated with mineral particles, and by no means wholesome, the answer will appear satisfactory. In the 4th volume of the *Antiquities* of Father Montfaucon, plate 128 shows, with how much care these immense works were constructed. From distance to distance spiramenta were left, that, if the water should happen to be stopped by any accident, it might gradually disengage, till they could clear its ordinary passage. There were likewise, even in the very canals which conveyed the water, cavities considerably deeper than its internal surface, into which the stream was precipitated, and where it remained stagnant till it was refined from mud and feculence; and ponds, where it might expand itself till it was purified.

(4.) **AQUEDUCTS, MAGNIFICENCE OF THE ANCIENT.** The aqueduct of the **AQUA MARTIA** had an arch of 16 feet in diameter. The whole was composed of three different kinds of stone; one of them reddish, another brown, and a third of an earth colour. Above, there appeared two canals; of which the highest was fed by the new waters of the Tiverone, and the lower by what they called the *Claudian* river. The entire edifice is 70 Roman feet high. Near this aqueduct, we have in Father Montfaucon the plan of another

with three canals; the highest supplied by the **AQUA JULIA**, that in the middle from *Tevera*, and the lowest from the aqua *Martia*. The arch of the aqueduct of the aqua *Claudia* is of hewn stone, very beautiful; that of the aqueduct of the aqua *Neronia* is of bricks: they are each of them 72 Roman feet in height. The canal of the aqueduct, which was called **AQUA APPIA**, deserves to be mentioned for a singularity which is observed in it; for it is not, like the others, plain and gradual in its descent; but much narrower at the lower than the higher end. The consul *Frontinus*, who superintended the aqueducts under the emperor *Nerva*, mentions nine of them which had each 13,594 pipes of an inch in diameter. *Vergil* observes, that, in the space of 24 hours, Rome received 500,000 hogsheds of water. Not to mention the aqueducts of *Drusus*, and *Rimini*, that which gives the most striking idea of Roman magnificence, is the aqueduct of *Metz*, of which a great number of arcades still remain. These arcades crossed the *Moselle*, a river which is broad and vast at that place. The copious sources of *Gorze* furnished water for the representation of a sea fight. This water was collected in a reservoir: from thence it was conducted by subterraneous canals formed of hewn stone, and so spacious that a man could walk erect in them: it traversed the *Moselle* upon its superb and lofty arcades, which may still be seen at the distance of two leagues from *Metz*; so nicely wrought and so finely cemented, that, except those parts in the middle which have been carried away by the ice, they have resisted, and will still resist, the fiercest shocks of the most violent seasons. From these arcades, other aqueducts conveyed the waters to the baths, and to the place where the naval engagement was mimicked.

(5.) **AQUEDUCTS, MODERN.** If we may trust *Colmenarus*, the aqueduct of *Segovia* may be compared with the most admired labours of antiquity. There still remain 159 arcades, wholly consisting of stones enormously large, and joined without mortar. These arcades, with what remains of the edifice, are 102 feet high; there are two ranges of arcades, one above another. The aqueduct flows through the city, and runs beneath the greater number of houses which are at the lower end. After these enormous structures, we may be believed when we speak of the aqueduct which *Lewis XIV.* caused to be built near *Maintenon* for carrying water from the river *Bucq* to *Veilles*: it is perhaps the greatest aqueduct now in the world; being 7000 fathoms in length, about 2560 in height, and containing no fewer than 1400 arcades.

AQUEINTABLE, *adj.* easy to be acquainted with. *Chauc.*

AQUELEIA. See **AQUILEIA**.

(1.) **AQUENSIS CIVITAS, AQUÆ AUGUSTÆ** or **AQUÆ TARBELLICÆ**, a town of ancient *Gallia*, famous for its baths. It was situated on the *Adour*, in the ci-devant province of *Gascogne*, which now forms a part of the department of *Gers*. It is now called **ACQS, AQUE**, or **D'AZ**. See **ACQS**, N° 2.

(2.) **AQUENSIS CIVITAS**, the ancient name of *Aix*. See **AIX**, N° 1. and **AQUÆ SEXTIÆ**.

* **AQUE**

the emperor Nero, historians have each written a different version of the story. The Roman historian Tacitus, who lived in the first century of the Christian era, wrote that Nero was a cruel and tyrannical ruler. He was the son of the emperor Claudius and the empress Livia. Nero was a young man when he became emperor, and he was influenced by his mother and his advisors. He was a patron of the arts and a lover of luxury. He was also a cruel and tyrannical ruler. He was the son of the emperor Claudius and the empress Livia. Nero was a young man when he became emperor, and he was influenced by his mother and his advisors. He was a patron of the arts and a lover of luxury. He was also a cruel and tyrannical ruler.

the Roman grandeur. It is now called *Orizaba*, and lies on the *Sierra de San Juan de Compostela*, *Lat. 42° 30' N. Lon. 101° 30' W.* At the base of Carthage is *San Juan de los Rios*, a tributary of *Guadalupe* in *Coahuila*, mentioned by *Ptolemy*.

AQUILAVERNESE, the inhabitants of *Aquila*.

AQUILULUS, belly, or bird time. See *Quilulus*.

(1) **AQUILA**, a new born in *Montana*. It is found in *San Francisco*, or *Franciscana*, birds, for example, to make leather tents for the Roman troops. They were early converted to the Christian faith, perhaps by Peter's pentecostal sermon. After they had resided some time at Rome, the edict of *Constantine*, banishing all Jewish rites, obliged them to leave and return to *Constantinople*, where Paul lodged with them, wrought at their business, till probably to the Gentiles, he went and lodged with them. They attended Paul to *Ephesus*, where he exposed her lives to protect him, and used *Aquila* as a name of the Lord more than of the city. They returned back to Rome, where the church of the *Christians* was held in their house, where they were visited by Paul, in his epistle, near *Ephesus*. They returned to *Asia*, and were near *Ephesus*; and were there when Paul had his epistle to *Timothy*. *Asia xviii. c. 5. s. 1. Tim. ii. 1.*

(2) **AQUA**, an astronomy, the *EALES*, a division of the northern hemisphere, usually used with *Antinous*. The stars in the constellations *Aquila* and *Antinous*, in *Ptolemy's* catalogue, are 111 to *Ycho's* 191 in *Hemert's* 443; in *Ptolemy's* catalogue, 71.

(3) **AQUILA**, a chess piece, has several significations according to the epistles joined with it.

AQUILA ALBA, a combination of corrosive matter, with fresh mercury, called *mercureus albus*.

AQUILA TRICOLORE, a term used by the ancients, to signify the coloring of medals to preserve them, &c.

(1) **AQUILA**, in geography, a fine large city, lately called *Avia*, and *Avila*, and capital of *Castro*, seated on a hill, on the right of the river *Alamo*, or *Pedraza*, near its mouth. It is a noble castle, and is situated immediately under the sky. The land yields it produces plenty of *silicon*. It was almost entirely destroyed by an earthquake, in February 1761. See *Paris*.

the eagle. See FALCO.

AQUILA-BARBEAU, a small town of Spain, in Old Castile.

AQUILA-BARON, in botany, a name given by Linnaeus to the tree, whose wood is the AQUILAGUM, or lignum albi of the Arabs.

AQUILA-BUS CAMPO. See AQUILA-DE-CAMPO.

AQUILA-BUS, a village in Staffordshire, near Newcastle.

(I.) AQUILEGIA, columbine. A genus of the pentagynous order, belonging to the polyandria class of plants; and, in the natural method, ranking under the 16th order, Mulsiklingia. It has no calyx; the petals are five, with a burnished nectarine inflexed towards each; and there are five regular sepals. There are 4 species viz. 1. *AQUILEGIA ALPINA*, with long oval flowers, grows naturally near Ingleborough hill in Yorkshire. The flowers are much larger than those of the garden columbine.

2. *AQUILEGIA CANADENSIS*, or Canada columbine. Flowers almost a month before the *a. alpina*; they are also preferred in the gardens of the curious, though not at all remarkable for beauty. There is a variety of this with taller flowers &c.

3. *AQUILEGIA HYBRIDA*, or garden columbine. Of this there are great varieties, not only in the colour and shape of their flowers, but also in the form. They are commonly either *rep. columbinæ*; the colours are chequered, blue, red, and white, and some are finely variegated with two colours. There are others with sharp pointed petals in form of a star, and of these there are single and double flowers of the same colours with the former.

4. *AQUILEGIA SILVATICA*, or wild columbine with black flower, is found growing wild in some woods of England.

(II.) AQUILEGIA CULTIVATA OF THE ARTS. All these species are propagated by sowing the seeds, or putting the old roots; but the former method is decidedly preferable. The old roots are very apt to decay.

The seeds should be sown in a nursery bed in August or September, for which purpose they are kept till the spring seldom grow well, or at least remain in the ground for a whole year. The spring following the plants will appear above ground, and should be kept clear of weeds, and the ground round them must be weeded.

In the middle of May, they may be transplanted from seedlings to transplant, for which purpose these beds of good universal earth should be prepared.



pared, planting them therein at 8 or 9 inches distances from each other. In the following autumn, by which time the plants will have acquired strength enough to flower the year following, the roots should be carefully taken up and planted in the borders of the flower garden: but where their roots are designed to be preserved in perfection, all the flower stalks must be cut off as soon as the flowers are past. In order to keep up a succession of good flowers, fresh seeds should be sown every year; and it will likewise be advantageous to exchange the seeds with some brought from a distant place.

(III.) **AQUILEGIA**, MEDICINAL USES OF THE. Columbine has been looked upon as aperient; and was formerly in great esteem among the common people for throwing out the small-pox and measles. A distilled water, meditated vinegar, and conserve, were prepared from the flowers; but they have long given place to medicines of greater efficacy.

AQUILEIA, an ancient and large city of the Carni, or Veneti, in Italy, seated on the rivers, Natiso and Turrus, about 30 miles W. of Trieste. A Roman colony was settled in it, between the first and second Macedonian wars, to be a bulwark against the neighbouring barbarians. It was afterwards increased with 1500 families by a decree of the senate; from which it became a very famous port. The emperor Julian ascribes the appellation to the augury of an eagle at the time of building it; but Isaac Vossius on Mela, to the great plenty of water, as if the town were called Aquilegia. The harbour, at the mouth of the Natiso, is distant 60 stadia from the city; so that ships of burden are towed up the river. In 452 it was besieged by Attila with an innumerable host of barbarians. The walls were assailed by a formidable train of battering rams, moveable turrets, and engines, that threw stones, darts, and fire; and the monarch of the Huns employed the forcible impulse of hope, fear, emulation, and interest, to support the only barrier which delayed the conquest of Italy. Aquileia was at that period one of the richest, the most populous, and the strongest of the maritime cities of the Adriatic coast. Three months were consumed without effect in the siege; till the want of provisions and the clamour of his army compelled Attila to relinquish the enterprise, and reluctantly to issue his orders that the troops should strike their tents the next morning and begin their retreat. But as he rode round the walls, pensive, angry, and disappointed, he observed a stork preparing to leave her nest in one of the towers, and to fly with her infant family towards the country. He seized, with the ready penetration of a statesman, this trifling incident which chance had offered to superstition; and exclaimed, in a loud and cheerful tone, that such a domestic bird, so constantly attached to human society, would never have abandoned her ancient seats, unless those towers had been devoted to impending ruin and solitude. The favourable omen inspired an assurance of victory; the siege was renewed and prosecuted with fresh vigour; a large breach was made in the part of the wall from whence the stork had taken her flight; the Huns mounted to the assault with irresistible fury; and the succeeding generation could scarcely discover the ruins of

Aquileia. The place, however, which is still called Aquileia, there are several inscriptions and antiquities to be seen in it, which are worthy of traveller's notice; and, though dwindled into a poor village, it gives a title to the patriarch of Aquileia. The patriarch is named by the Venetians, and reside at Udine, because Aquileia belongs to the House of Austria. Long. 13. 36. E. Lat. 46. 20. N.

AQUILICIUM, **AQUÆLICUM**, or **AQUILICIANA**, in antiquity, a sacrifice, celebrated among the Romans, in time of excessive droughts, to obtain rain of the gods.

AQUILI **DN**, an epithet of some of the heathen gods, supposed to be black complexioned.

AQUILIFER, [from *aquila*, an eagle, and *ferre*, I bear,] among the Romans, an ensign bearer, who carried the standard on which the eagle was represented.

* **AQUILINE**. *adj.* [*aquilinus*, Lat. from *aquila*, an eagle.] Resembling an eagle; when applied to the nose, hooked.—

His nose was *aquiline*, his eyes were blue,
Ruddy his lips, and fresh and fair his hue.

Dreder

—**Gryps** signifies some kind of eagle or vulture, from whence the epithet *grypus* for an hooked *aquiline* nose. *Brown*.

AQUILO, is used by Vitruvius for the N. wind; or that which blows at 45° from the N. towards the E. point of the horizon.—The poet gave the name of *aquilo* to all stormy winds dreaded by the mariner.

(1.) **AQUILUS**, among the ancients, a dark, dusky colour, approaching to black.

(2.) **AQUILUS**, in ornithology, a species of pican.

AQUIMINARIUM, in antiquity, a kind of ritual vessel, wherein the Romans carried their holy water for expiation, and other religious offices.

(1.) **AQUINAS**, St Thomas, styled the Angelical Doctor, was of the ancient family of the counts of Aquino, descended from the kings of Sicily and Arragon; and was born in the castle of Aquino, in the Terra di Lavoro in Italy, A. D. 1225. He entered into the order of the Dominicans; and after having taught school divinity in most of the universities of Italy, at last settled at Naples: where he spent the rest of his life in study, reading lectures, and acts of piety; and was so far from the views of ambition or profit, that he refused the archbishoprick of that city when it was offered him by Pope Clement IV. He died in 1274, leaving an amazing number of writings, which were printed at Venice in 17 vols. folio, A. D. 1490. He was canonized by Pope John XXII. in the year 1323; and Pius V. who was of the same order with him, gave him, in 1564, the title of the Fifth Doctor of the church, and appointed his festival to be kept with the same solemnity as those of the other four doctors. His authority has always been of great importance in the schools of the Roman Catholics. Lord Herbert, in his life of Henry VIII. tells us, that one of the principal reasons which induced that king to write against Luther was, that the latter had spoken contemptuously of Aquinas.

(2.) **AQU**

His tale was
Ruddy his lips, and
—Gryps signifies from
from whence the eye
aquiline nose. Brown.
AQUILO, is called
wind, or that which
winds the E. part
gave the name of aqu
by the mariners.
(1.) AQUILUS, is
dark colour, as
(2.) AQUILA, is
falcon.
AQUIMINARTU
was vellet, whence
water for expansion.
(1.) AQUINAS,
Real Doctor, was a
count of Aquino.
Sicily and Aragon.
quons in the Terra
or 1333. He entered
the sea, and after a
month of the winter
at Naples where he
died, reading Latin
was so far from the
that he refused the
when it was offered
He died in 1274. In
university, which was
founded, A. D. 1269.
John XXII. in the
was of the same order
the rule of the Friars
appointed his father
hereditary as Duke of
authority has since
the school of the
bert, in his life of
of the principal rea
to write against La
spoken contemptuously

named valley of the river Melpho. R
o, See No. 2.
ual history, the name of a
monkey, called by the people
onkey, as being much larger
size.
1, one of the ancient names
s, (which see) so called from
e brother of Nero, who fre
build a tower in it.
e ancient name of Guienne,
of France, which now forms
of Gironde, and of Lot and
belonged to the kings of
ons of William the Conquer
they are all that now belong
Britain, of the ancient domi
Normandy. See Aquis
t.
ancient inhabitants of Aquil
cient geography, one of the
ons of Gallia Comita, de
bounded by the Garonne,
Ocean; that is the Aquitania
Aquilas let different bound
the Cevennes, the Pyre
It was called Gallia Aqu
In the old Notitia, Proven
comprised Guienne (which
don of Aquitania) and Gas
To match. (Oly.) Baidy.
leade, Baidy.
logy, a name by which some
e acorns, a fish much ap
re of the atavus, or flad.
from aque, Lat.] Watery;
water. Dicit.
falsus Aquas, the name gi
nus nurova.
[from aquas.] Waterish.
ne of a disorder of the eyes,

emerged to that of Mr Flanthead, of nine feet.
ARAB, or ARABIAN HORSE. See EQUUS.
ARABIAH. See ARABIA, § 2 and 4.
ARABANT AD CUR AM DOMINI, [from ara
I plough, in law, was intended of those who held
by the tenure of ploughing and tilling the lord's
lands within the manor.
ARABESQUE, or ARABESK, something done
after the manner of the Arabians. ARABESQUE,
GROTESQUE, and MONUMENTAL, are terms applied
to such paintings, ornaments of frescoes, &c.
wherein there are no human or animal figures,
but which consist wholly of imaginary foliage,
plants, falks, &c. The words take their rise
from hence, that the Moors, Arabs, and other
Mahometans, use these kinds of ornaments; their
religion forbidding them to make any images of
men, or other animals. Arabesque is used by Sto
phen Rieu, Esq. in his book on Architecture, for
that style of building vulgarly called Modern Go
thic, which he also terms Saracenic and Moorish;
the introduction of which he ascribes to the Moors,
Arabians, or Saracens. This manner of building
was introduced into Europe through Spain. The
Crusades gave the Christians an idea of Arabian
architecture, which they afterwards imitated. Sir
C. Wren distinguishes the heavy Gothic as Angli
Saxon, the lighter as Arabesque.
(1.) ARABIA, ANT. QUIT & ETYMOLOGY OF.
Arabia is an extensive country on the E. of Asia,
famous from the remotest antiquity for the inde
pendency of its inhabitants during the vast con
quests of the Assyrians, Persians, Greeks and Ro
mans, and, in later times, for being the centre of
an empire equal, if not superior, in extent to any
that ever existed. Upon its antiquity, Mr Nie
buhr, in his Travels through Arabia, observes,
that, "If any people in the world afford in their
history an instance of high antiquity, and of great
simplicity of manners, the Arabs surely do. Com
ing among them, one can hardly help fancying
one's self suddenly carried backwards to the ages
which succeeded immediately after the flood.—
We are here tempted to imagine ourselves among
the old patriarchs, with whose adventures we
have



have been amused in our infant days. The language, however, which has been spoken for time immemorial, and which so nearly resembles that which we have been accustomed to regard as of the most distant antiquity, completes the illusion which the analogy of manners began." This country was, in the earliest ages, called ARABIA, concerning the etymology of which word there are various conjectures. It has most generally been derived from the Hebrew word *ארא*, signifying, *the west, mixture, or traffic*; but, according to M. Volney, *Arab*, in the ancient language of these countries, signifies a *solitude or desert*.

(2.) ARABIA, APPEARANCE, CLIMATE, &c. OF. M. Niebuhr, the latest European traveller into this extensive country, gives the following brief description of its general appearance and climate. "Intersected by sandy deserts, and vast ranges of mountains, it presents on one side nothing but desolation in its most frightful form, while the other is adorned with all the beauties of the most fertile regions. Such is its position, that it enjoys, at once, all the advantages of hot and of temperate climates. The peculiar productions of regions, the most distant from one another, are produced here in equal perfection. Having never been conquered, Arabia has scarcely known any changes, but those produced by the hand of nature; it bears none of the impressions of human fury, which appear in so many other places. With all these circumstances, so naturally calculated to engage curiosity, Arabia has been hitherto but very little known. The ancients, who made their discoveries of countries, by conquering them, remained ignorant of the state and history of a region, into which their arms could never penetrate. What Greek and Latin authors mention concerning Arabia, proves, by its obscurity, their ignorance of almost every thing respecting the Arabs. Prejudices relative to the inconveniences and dangers of travelling in Arabia, have hitherto kept the moderns in equal ignorance." Other authors agree with Niebuhr, in representing the climate as exceedingly various; the air in some places being quite mild and temperate, and in others so excessively hot and sultry as to be absolutely "poisonous." These effects Mr Niebuhr accounts for, by the different winds, which blow over this extensive country. "The nature of the winds (he says) differs, in Arabia, with the point of the compass from which they blow, and the tract over which they respectively pass. The same wind is, in different places, dry or moist, according as it blows over the ocean, or over deserts. On the shores of the Persian Gulph, the S. E. wind is accompanied with a degree of moisture which, when the heat is intense, occasions violent sweatings; the N. W. passing over the great desert, is more torrid, but less disagreeable; this last wind heats metal in the shade, as if they were exposed to the sun; and its heat, suddenly added to that of the atmosphere, often suffocates men and other animals. The Arabians, when they travel, carry with them garlic and dried grapes, for the reviving of such persons as may fall down fainting, from the effect of these hot blasts. Notwithstanding its torrid qualities, this N. W. wind serves to cool their liquors for the Arabians, in the middle of summer,

In order to this, they put their water into bardahs or unglazed pots, made of a sort of porous earth and then, having these pots in a place exposed to the current of this hot wind, the water is thereby rendered very cool; a circumstance well-known in hot countries, and ascribed by naturalists to the effects of sudden evaporation. Another wind, of a more dangerous nature, is the famous *Samum*, or *Samiel*; which seldom blows within Arabia, but frequently upon its frontiers. This wind prevails only on the confines of the great desert, where the agitation of the air forms a current for the vapours which are raised by the heat of the sun from that parched territory. The place the most exposed to this destructive wind, are the banks of the Euphrates, and sometimes the environs of Mecca, when the N. wind blows from the desert. It is not unknown in Persia, on the borders of those arid plains; and it is said to have been felt in some places in Spain, near the vast tracts of desert sands which deform that fine kingdom. The effects of the *Samum* are instant suffocation to every living creature that happens to be within the sphere of its activity, and immediate putrefaction of the carcases of the dead. As a similar rapidity of putrefaction has been observed to take place upon bodies deprived of life by thunder, or by the electric shock, it has been conjectured, that electrical matter, which is very generally diffused through nature, might be the cause of the peculiarly noxious qualities of this wind. The Arabians discern the approach of the *Samum* by an unusual redness in the air; and they say that they feel a smell of sulphur as it passes. However this may be, the only means by which any person can preserve himself from suffering from the noxious blasts, is, by throwing himself down with his face upon the earth, till this whirlwind of poisonous exhalations has blown over; which always moves at a certain height in the atmosphere. Instinct even teaches the brutes to incline their heads to the ground on these occasions. The other meteors of Arabia are common to with all other hot countries. A clear sky, so often obscured by clouds, renders storms very uncommon in the plains. The air discharges its electric matter in globes of fire, and by the phenomena called shooting stars, which are not unfrequently of considerable bulk. In the most arid tract near the sea, the dews are singularly copious. But, notwithstanding this humidity, the air is so pure that the inhabitants sleep in the open air; never slept sounder than where I found my bed wet with dew in the morning. There are, however, places where one dares not sleep in the open air, for fear of being struck with a palsy. By long experience the inhabitants of those parts have learned what precautions to take, and these are always peculiarly necessary to an European unaccustomed to the climate."

(3.) ARABIA, BOUNDARIES, AND EXTENT OF. Arabia is bounded on the W. by Palestine, part of Syria, the isthmus of Suez, and the Red Sea, called by the Arabs the sea *al Kozam*; on the E. by the Euphrates, the Persian gulf, and bay of Ormos; on the N. by part of Syria, Diyar-Becr, Irak, and Khuzestan; and on the S. by the straits of Babel-Mandel and the Indian ocean. It is a narrow

narrower as we approach the frontiers of Syria and Diyar-Becr; and, by reason of the proximity of the Euphrates to the Mediterranean, may be looked upon as a peninsula, and that one of the largest in the whole world. It lies between 12° and 35° of N. Lat. and 36° and 61° of E. Long. Its greatest length from N. to S. is about 1430 miles; and its breadth from E. to W. is about 1100.—Arabia Proper, however, is much narrower, including little more than what was comprehended by the ancients under the name of ARABIA FELIX, (See § 4. N^o. II.) and here the Arabs have been settled almost since the flood.

(4.) ARABIA, DIVISIONS OF. The most ancient division of the peninsula of Arabia was into *Arabab* and *Kedem*, as we learn from Scripture: the first of which implies the west, and the other the east, denoting the situation of the two countries.—Ptolemy was the first who divided this peninsula into three parts, viz. Arabia Petraea, Arabia Deserta, and Arabia Felix, which division has generally prevailed ever since, among European geographers. But Mr Niebuhr, who was expressly commissioned, along with other four gentlemen of abilities, by the king of Denmark, for the purpose of making discoveries, tells us that the Arabs know of no such names or divisions. "They divide their country," he says, "into 6 great provinces; Hedjas, lying along the Arabic Gulph, between Mount Sinai and Yemen, and extending inland so far back as to the confines of Nedsjed; Yemen, a province stretching from the border of Hedjas, along the Arabic Gulph and the Indian Ocean, to Hadramaut, and bounded on the N. by Nedsjed; Hadramaut, on the Indian Ocean, conterminous with Yemen on one side, and with Oman on the other, bounded northwards by Nedsjed; Oman, lying also on the shore of the Indian Ocean, and encompassed by the provinces of Hadramaut, Lachsa, and Nedsjed; Lachsa, or Hadsjar, extending along the Persian Gulph, and having Nedsjed for its interior boundary; Nedsjed, comprehending all the interior country, and bounded by the other five provinces; its northern limits are the territories occupied by the Arabs in the desert of Syria.—These territories may indeed be reckoned a 7th province; and to them may also be added the description of the Arabian establishments on the southern coast of Persia." But however just this account of M. Niebuhr's may be, it is proper in works such as ours, to explain, under this article, those divisions and denominations by which Arabia has been hitherto best known; leaving the more new divisions of M. Niebuhr's, to be more particularly illustrated in their order. See HEDJAS, HADRAMAUT, &c.

I. ARABIA DESERTA was bounded on the N. by the Euphrates, which separated it from Mesopotamia; on the W. by Syria, Judaea, and Arabia Petraea; on the E. by a ridge of mountains which separated it from Babylonia and Chaldaea; on the S. by Arabia Felix, from which it was likewise separated by several ridges of hills. By far the greatest part of this kingdom, as well as the former, was a lone some desert, diversified only with plains covered with sand, or mountains consisting of naked rocks and precipices; nor were they ever, ex-

cept sometimes at the equinoxes, refreshed with rain. The few vegetables which they produced were stunted by a perpetual drought, and the nourishment afforded them by the nocturnal dews was greatly impaired by the heat of the sun in the day time. Throughout the deserts were found huge mountains of sand, formed by the violence of the winds that continually blew over them in the day time, though they ceased in the night.—Wells and fountains were for the most part exceedingly rare; however, notwithstanding the sterility of these countries, the vast plains of sand just now mentioned were interspersed with fruitful spots, which appeared here and there like so many islands in the midst of the ocean. These being rendered extremely delightful by their verdure, and the more so by the neighbourhood of those frightful deserts, the Arabs encamped upon them; and having consumed every thing they found upon one, removed to another, as is the custom of their descendants the Bedowens at this day. These fruitful spots were likewise frequent in Lybia, and by the Egyptians called *quases*, or *abases*, as we learn from Strabo. The barren part of Arabia Felix, bordering upon the Red Sea, was in like manner interspersed with abases; which probably gave the name of *Abaseni* to a nation settled there, and in the adjacent fertile region.—A body of these, it is said, crossing the straits of Babel-Mandel, passed into Ethiopia, which from them received the name of *Abassia*. From this account of Arabia Deserta, we may reasonably conclude, that the towns said by Ptolemy to have been situated in it were places of very little consequence.

II. ARABIA FELIX, OR THE HAPPY, according to Mr Niebuhr, contains the two provinces of YEMEN and HADRAMAUT, which see in their order. But according to ancient geographers it was bounded on the N. by the two kingdoms just described; on the S. by the Red Sea; on the E. and W. by part of that sea, together with the Arabian and Persian gulfs. In Strabo's time, it was divided into 5 provinces, by the oriental historians called *Yaman*, *Hejaz*, *Tebama*, *Najd*, and *Yamama*. In this district stood several towns, particularly Nyfa, famous for being the birth-place of Bacchus; and Mufa or Muza, a celebrated emporium or harbour, where the Arabian merchants resorted with their frankincense, spices, and perfumes. These two were situated in the province of Yaman. In that of Hejaz stood the still more famous cities of Mecca and Medina; also Thaisa or Taisa, Gjudda or Jodda, Yanbo or Al Yanbo, and Madian, the Modiano of Ptolemy, and the Midian or Madian of Scripture.

III. ARABIA PETRÆA, on the east, was bounded by Syria and Arabia Deserta; on the west, by Egypt, or rather the Isthmus of Suez, which separates Asia from Africa, and the Heropolitan gulph or western arm of the Red Sea; on the north, by Palestine, the lake Asphaltites, and Coelosyria; and on the south, by Arabia Felix. This tract did not admit of much cultivation, the greatest part being covered with dry sands, or rising into rocks, interspersed here and there with some fruitful spots. Its metropolis was Petra, which by the Syrians was styled Rakum, and in Scripture

Scripture Joktheel. Several other cities of Arabia Petraea are mentioned by Ptolemy; but as it is very improbable such a barren country should abound with large cities, we must look upon them as inconsiderable places.

(5.) **ARABIA, EARLIEST INHABITANTS OF.**—At what time the abovementioned kingdoms were first peopled, we have no certain accounts. The most considerable nations inhabiting Arabia Petraea, in the early ages; were the Ishmaelites, the Nabatei or Nabatheans, the Cedarzi or Kedareni, and the Agareni or Hagareni; and of these the Ishmaelites were the most powerful, if they did not comprehend all the rest; and if the Hagareni were not the same people with them, they must at least have been nearly related. Kimchi, an oriental historian, insinuates, that they were originally the children of Hagar by an Arab, after she had left Abraham. In after ages, the names of all the nations situated here, were absorbed in that of Saracens, by which the Ishmaelites are distinguished in the Jerusalem Targum. A nation also is mentioned by Pliny, called *Arraceni*, and *Saraceni* by Ptolemy and Dioscorides, which was probably no other than the Ishmaelites above mentioned. In Arabia Deserta several tribes resided, all of whom were very obscure, except the Aisitz and Agræi. The former are supposed by Bochart to have been Job's countrymen, and the latter to have been the same with the Hagareni, Arraceni, or Saraceni, abovementioned. Arabia Felix was inhabited by many different tribes; the most remarkable of which were the Sabæi, Geræi, Minæi, or Minnæi, Atranzitæ, Maranzitæ, Catabani, Ascitæ, Homeritæ, Sapphoritæ, Omanitæ, Saraceni, Nabathæi, Thamydeni, and Bni-zomenæ; but neither their limits nor situation can now be determined with any manner of precision. According to the oriental historians, the Arabs are divided into two classes; viz. the *old lost Arabians*, and the *present*. The most famous tribes among the former, were those of Ad, Thamud, Tasm, Jades, Jorham, Amalek, Amtem, Hasbem, Abil, and Bar. Concerning these, though now entirely lost and swallowed up among other tribes, there are some remarkable traditions, of which the following may serve as a specimen.

(6.) **ARABIA, FABULOUS TRADITIONS CONCERNING.** The tribe of Ad deduced their origin from Ad the son of Aws, or Uz, the son of Aram, the son of Shem, who, after the confusion of tongues, settled in Al Abkaf, or the winding sands in the province of Hadramaut, on the confines of Yaman, where his posterity greatly multiplied. Their first king was Shéddad, the son of Ad, who built a stately palace, and made a delightful garden in the deserts of Aden, which he designed as an imitation of the celestial paradise. This garden he called *Irem*: and when it was finished, he set out with a great retinue to take a view of it; but, having some thoughts of assuming divine honours, he was destroyed by a tempest from heaven, while yet a day's journey from his paradise. The garden and palace, however, were preserved, though invisible, as a monument of divine vengeance. After the death of Shéddad, the kingdom of Ad was governed by a long series of princes, concerning whom many fables

are related by the eastern writers. The conclusion of their history, however, is as follows:—“The Adites, in process of time, falling from the worship of the true God, into idolatry, God sent the prophet Hud, supposed to be the same with Heber, to preach to and reclaim them. But they refusing to acknowledge his mission, to obey him, God sent an hot and suffocating wind, which blew seven nights and eight days, and, entering at their nostrils, passed through the bodies, and destroyed them all, a very few only excepted, who had listened to Hud, and retired with him to another place.” Others relate “that, before this terrible catastrophe, they had been previously chastised with a 3 years drought, and therefore sent Kail Ebn Ithar, and Moré Ebn Sdaa, with 70 other principal men to Mead then in the hands of the tribe of Amalek, who prince was Moawiyah Ebn Becr, to obtain of God some rain. Kail having begged of God that he would send rain to the people of Ad, 3 clouds appeared, a white, a red, and a black one; and a voice from heaven ordered him to choose what he would. Kail failed not to make choice of the last, thinking it would be laden with most rain; but when this cloud came over them, it proved to be fraught with the Divine vengeance, and tempest broke forth from it, which destroyed them all.”

(7.) **ARABIA, GOVERNMENT OF.** Of the government of Arabia, we cannot give a better general view, than in the words of Mr Niebuhr (Vol. ii. p. 16, *et seq.*) “The most natural authority is that of a father over his family, as obedience is here founded upon the opinion of benevolence in the ruler. When the mournful survivors of the human race settled themselves anew, after the awful revolution by which the globe was, for a time, divested of its beauty, and depopulated, every family submitted readily to the guidance and direction of him to whom they owed their existence. As those families multiplied, the younger branches still retained some respect for the eldest branch. Of all the progeny, it was esteemed the nearest to the parent stem. And, though the subdivisions became more and more numerous, they still regarded themselves as composing but one body, in remembrance of their common origin. Such an assemblage of families all sprung from the same stock, forms what we call a tribe. It was, in this manner, easy for the representative of the eldest branch to retain some what of the primary paternal authority over the whole tribe to which he belonged. Sometime when a family became too numerous, it divided from the rest with which it was connected, and formed a new tribe. Upon other occasions, when several tribes found themselves separately too weak to resist a common enemy, they would combine, and acknowledge one common chief. And sometimes it would happen, that a numerous tribe might force some others that were weaker, to unite themselves to, and become dependent upon it; but seldom has this dependence degenerated into slavish subjection. This primitive form of government, which has ever subsisted without alteration among the Arabs, proves the antiquity of this people, and renders the pre-
patri-

confusion of languages settled in Arabia, extending themselves from Mesha to Sephar, a mountainous place in the south eastern part of that peninsula. According to the Arabian historians, he had 31 sons, all of whom left Arabia and went into India, except two, viz. Yarab and Jorham; the former of whom, they say, gave the name both to their country and language. Ishmael and his mother Hagar having been dismissed by Abraham, entered into the wilderness of Paran, as related in the book of Genesis. The sacred historian informs us, that during his residence in the wilderness he married an Egyptian; and the Arabian writers say that he also took to wife the daughter of Modad king of Hejaz, lineally descended from Jorham the founder of that kingdom. By the Egyptian he was probably the father of the Scenite or wild Arabs; and having allied himself to the Jorhamites, he is considered by the Arabians as the father of the greatest part of their nation. Kah-tan, or Joktan, is said to have first reigned, and worn a diadem in Yaman: but the particulars of his reign we no where learn. He was succeeded by Yarab already mentioned, he by Yashab, and Yashab by Abd Shems. He was wonderfully successful in his expeditions against his enemies, carried off great spoils, and took many of them prisoners. He is said to have built the city of Saba or Mareb, and above it a stupendous mound or building which formed a vast reservoir, containing all the water that came down from the mountains. By means of this reservoir the kings of Yaman not only supplied the inhabitants of Saba and their lands with water, but likewise kept the territories they had subdued in greater awe, as by cutting off their communication with it they could at any time greatly distress them. Abd Shems was succeeded by his son Hamyar, from whom the tribe of Hamyar is said to take its name; and he by a series of 17 kings, concerning whom we have no remarkable particular, except that from one of them called *Africus* the continent of Africa took its name. The last of these was succeeded by a daughter named *Balkis* or *Bel-kis*, whom some will have to be the queen of Sheba, who paid a visit to Solomon. After *Balkis* came *Malea*, surnamed *Nasberolneam* on account of his magnificence and liberality. Having had bad success in an expedition, where his army was overwhelmed by torrents of sand, he caused a brazen statue to be erected with the following inscription in the old Hamyaritic character. "There is no passage behind me, no moving farther; the son of Sharhabil." He was succeeded by *Shamar Yaraath*, so called on account of his being affected with a constant tremor. To this prince the city of Samarcand is said to owe its existence. After *Shamar Yaraath* we have a list of 15 kings, of whom nothing worth mentioning is recorded, except of one *Abu Carb Asaad*, who adorned the Caaba or temple of Mecca with tapestry, and first introduced Judaism among the Hamyarites. He was put to death by his subjects, probably on account of religion. The last of the 15 kings above mentioned was called *Abrabab*, who was succeeded by his son *Sabban*. He had that famous sword called *Samfannab*, which afterwards came into the hands of the khalif *Al Rashid*. This prince

was succeeded by *Dhu Shanater*, who had six fingers on each hand. He was abandoned to unnatural lust, and dethroned for abusing some of the noblest youths in the kingdom. To him succeeded *Yusef*, who lived about 70 years before Mahomet. He persecuted all those who would not turn Jews, putting them to death by various tortures, the most common of which was throwing them into a glowing pit of fire; whence he bore the appellation of the *lord of the pit*. This persecution is taken notice of in the Koran. The last of the Hamyaritic monarchs was *Dhu Jadan*, according to *Abulfeda*; but, according to others the *Yusef* just mentioned, who was surnamed *Dhu Nowas* on account of his flowing curls, and was the last who reigned in an uninterrupted succession. He was a bigotted Jew, as already mentioned; and treated his subjects with such barbarity, that they were obliged to ask the assistance of *Elefbaas* or *Elefbaan*, king of Ethiopia, against him. *Dhu Nowas*, not being able to make head against the Ethiopians, was at last driven to such extremity, that he forced his horse into the sea and lost both his life and crown together. The king of Ethiopia, having thus become master of Yaman, established there the Christian religion and fixed upon the throne one *Abryat*, an Ethiopian. Of this event, however, *Mr Niebuhr* expresses some doubts. *Abryat* was succeeded by *Abraha-Ebn-Al-Sabah*, surnamed the *slit-nose* from a wound he had formerly received in it. He was likewise styled *lord of the elephant*, from a story too ridiculous to deserve notice. He was succeeded by two other Ethiopian princes; but at last *Seif Ebn Dhu Yazan*, of the old royal family of Hamyar, having obtained assistance from the king of Persia which had been denied him by the emperor *Heraclius*, recovered his throne, and drove out the Ethiopians; but was himself slain by some of them who were left behind. The succeeding princes were appointed by the Persians till Yaman fell into the hands of Mahomet. We have already taken notice of the vast mound or reservoir made by *Abd Shems*, from which he supplied the city of Saba with water. This building stood like a mountain above the city, and was by the Sabæans esteemed so strong, that they were under no fear of its ever failing. The water rose almost to the height of 20 fathoms; and was kept in on every side by a work so solid, that many of the inhabitants had their houses upon it. About the time of Alexander the Great, however, a terrible inundation happened. According to the Arabian historians, God being displeased at the pride and insolence of the inhabitants of this city, resolved to humble them; and for this purpose sent a mighty flood, which broke down the mound that night whilst the inhabitants were asleep, and carried away the whole city with the neighbouring towns and people. This inundation is styled in the Koran the *inundation of Al-Haram*; and mentioned so terrible a destruction, that from thence it became a proverbial saying to express a total dispersion, "that they were gone and scattered like Saba."—By this accident no less than eight tribes were forced to remove their habitations, some of which gave rise to the kingdoms of *Hira* and *Ghassan*. The kingdom of *Hira* was founded

ever entirely subdue their own nation. Many chiefs, in the interior parts of the country, still maintained their independence, without respecting the caliph in any other light than as the head of their religion. The authority of the caliphs was merely spiritual, except in their dominions over a part of the coast, where they were acknowledged as sovereigns." But, as Mr Heron, his translator, justly observes in a note, "perhaps the caliphs might have been more successful in subjugating their fellow countrymen, if Syria, India, Egypt, and Spain had not presented more inviting scenes of conquest and of empire." The history of Mahomet's successors, therefore, being rather local, than relating to the general history of Arabia, will be found under the article KHALIFS; and we shall conclude this section in the words of Mr Niebuhr: "After the ruin of the power of the caliphate by the Turks, Arabia shook off the yoke to which it had been in part subjected, and came to be governed, as formerly, by a number of chiefs, more or less powerful, descended from different indigenous families. No neighbouring power ever attempted to subdue this country, till the Portuguese penetrated to India, and made their appearance in the Red Sea. Then, in the beginning of the 16th century, sultan EL GURAY, detestable to rid himself of those new comers, whom he viewed as dangerous, fitted out a fleet to expel the Portuguese. That fleet, availing themselves of the opportunity, seized almost all the sea-port towns of Arabia. But, when the dynasty of the Mammalukes was terminated by the Turks, these cities fell again into the hands of their natural sovereigns. The Turks continued the war with the Portuguese, in order to secure Egypt, their new conquest. Soliman Pacha, at the head of a powerful fleet, after the example of the last sultan of the Mammalukes, seized all the towns upon the Arabic Gulph. His successors pushed their conquests still farther, and subdued great part of Yemen, penetrating backwards to the Highlands; so that Arabia became almost entirely a province of the sultan of Constantinople, and was governed by Pachas, like the other provinces of the Ottoman empire. In the interior parts, however, there still were independent princes and Schiechs, who had never been subdued, but continued to harass the Turks, and to drive them towards the coasts. After various reiterated efforts, a prince of the family now reigning at Sana, at length succeeded, about the middle of the last century, and obliged the Turkish nation to evacuate all the places upon the Arabian coast, which they had occupied for more than a century. The Turks now possess nothing in this country, but a precarious authority in the city of Jidda: And it is therefore absurd to reckon Arabia among the Ottoman provinces, since it is properly to be considered as independent of all foreign powers. A people who, like the Arabs, have so long detached themselves from the rest of the world, cannot undergo any very important revolutions, that may deserve to be commemorated in history. The events which take place among them, are only petty wars and trifling conquests, worthy of their poor chiefs, and narrow divisions of territory."

(10.) ARABIA, PECULIAR PLANTS OF. "The

indigenous plants of Arabia have been hitherto so little known, that Mr Forskal (one of the 4 gentlemen, who accompanied Mr Niebuhr, in his Travels, and who all died before his return) was obliged to form no fewer than 30 new genera; not to speak of the doubtful species, which he durst hardly arrange under any known genera. Of the 800 plants (says Mr Niebuhr) described by my late friend, I shall content myself with speaking of a small number remarkable for their novelty or utility. The first place is, no doubt, due to those which are used for food. The Arabians cultivate wheat, barley, and durra, (*the Holcus Irii*). The latter grain, *sorgo*, or great millet, seems to be a native of Arabia, for several wild species of it are here to be found, on which the birds feed. That which is cultivated, in order to attain full maturity, requires considerable warmth, and upon a good soil grows to a great height. The Arabians cultivate several pot-herbs, of the same nature as ours; such as lettuces, spinnach, carrots, a very delicate sort of purslain with sharp leaves; a sort of raddish, of which only the leaves are eaten; water-cresses; and above all, great variety of gourds, cucumbers, pumpkins, and melons. Of pumpkins and melons, several sorts grow naturally in the woods, and serve for feeding camels. But the proper melons are planted in the fields, where a great variety of them is to be found, and in such abundance, that the Arabians of all ranks use them, for some part of the year, as their principal article of food. They afford a very agreeable liquor. When the fruit is nearly ripe, a hole is pierced into the pulp; this hole is then stopped with wax, and the melon left upon the stalk; within a few days the pulp is, in consequence of this process, converted into a delicious liquor. The pot-herbs which are natives of India, but are now cultivated or naturalized in Arabia, are,—*Sida*, resembling our mallows; *Hibiscus*, resembling mallows also, but of which only one species is proper to be eaten, *Jussiaea*, nearly like the *Lysimachia*; *Acanthus*, a beautiful species; and *Bunias*, somewhat like our cabbages; the leaves of these plants are boiled. There are other Indian plants whose leaves the Arabians eat raw, and by way of salad, such as *Come*, not unlike mustard; *Stachys*; and *Dolichos*, a sort of bean. There are also some leguminous vegetables peculiar to the country, which require no culture. Such are *Corchorus*, and the plant like our mallows; *Sesambus*, a new plant like the *Salix Calaf*, the leaves of which, when boiled, have a pleasing acid taste; lastly, the celebrated *Coicasia*, (*Artem Coicasia Linn.*), of which the Egyptians have always made great use, and which grows in abundance in all marshy places in Arabia. The odoriferous herbs, of which we have also species, are lavender, marjoram, the hily, and some pinks. But, the most fragrant, and those which produce the finest flowers, are plants common to Arabia and India. Those valued for their perfume are *Ocymum*, the most beautiful species of the basilic; *Isula*, a very odoriferous sort of clivampare, a native of India; *Cacalia*, from the heart of Africa; and *Dianthera*, a plant as yet but little known, of which Mr Forskal discovered 8 species. In the sandy deserts grows a plant of a new genus, named

ed with any sort of terror in Arabia, where it catches grey cats and dogs, but never ventures to attack men. Wild boars, wolves, and foxes, are found in Arabia, but the most common carnivorous animal is a sort of wild dog, more like the Turk *Typhlops*, by the Arabians *el Fox*.—In the fertile countries of Arabia, tame hawks are very plentiful, and all sorts of poultry are bred in great

numbers. The *Shahin* is a bird of prey which it naturally follows these *muftis* in the course of their passage. The *Shahin* is a bird of prey which frequents a small district in Arabia. The *Shahin* is famous for two beautiful feathers, with which Highlanders adorn their bonnets, and to which, when uninjured, the bird, it forms, serves as a nest. The *Toucan* of Brazil, rare and valuable for its gilded plumage, is said to be bred in

Arabia. In Arabia, the land-tortoise is common; the peasants bring them by cart-loads, to the markets of several towns in the east. The eastern Christians eat these animals in lent, and drink their blood with great relish. We saw several sorts of lizards, of which the only dangerous one was that called by the Egyptians GECKO. It is said that the saliva of this creature, falling upon victuals, infects the persons who eat them with the leprosy. There are in Arabia several sorts of serpents, the bite of which is often mortal. But the innocent as numerous as the dangerous serpents. Of late the bite occasions only a disagreeable itching, which the Arabians cure by applying the leaves of the caper tree to the wound. In general, life is endangered only by the bite of such serpents as have a distinct row of teeth larger than the rest of the teeth. The Arabians in Egypt are acquainted with this law in the structure of reptiles, and play freely with serpents, after pulling out the long fang, which serve to conduct the poison. In Arabia, the only serpent that is truly formidable is that called Baetan, a small slender creature, spotted black and white; its bite is instant death, and the dead body is swelled by the poison in a very extraordinary manner. Mr Forskal discovered in the Red Sea several sorts of ray fishes which are unknown in Europe. That sea is in general stored with a great variety of fishes; and in the short passage between Suez and Jidda, he observed more than 100 new species, only a part of which he could rank among the known genera. He was obliged to form 4 new genera, which he named *Scorpaena*, *Scarus*, *Signanus*, and *Acanthurus*. A new murex which he met with, appeared so different from that already known, that he was induced to class it as a particular genus. Among the new species are some belonging to genera which are found also in our seas; such are several cod fishes hitherto unknown; new species of mackerels, mullets, perch, perches, &c. Others of these species belong to genera peculiar to the seas adjacent to countries, such as the *Chetodon* and the *Sciaena*. In our passage over the Red Sea, we saw troops of flying fishes, which rose from time to time above the surface of the water; but we discovered no flying serpent in the course of our voyage; although the Arabians give this name to a serpent which should rather be called the leaper. This serpent fixes himself by the tail to a low branch of a tree, and then giving himself an impetus, by means of his elastic tail, springs from branch to branch successively, till he reaches the top. The locusts have a great influence on the condition of the inhabitants of Arabia, and of several other countries in the east. Mr Forskal calls the locust which infects Arabia, *Gryllus Gregarius*, and thinks it different from that which is called by Linnæus *Gryllus Migratorius*, and which is a native of the deserts of Tartary, from which it passes through the neighbouring countries, into Poland and Germany. The *Gryllus Gregarius* merits this denomination; for the locusts of this species appear to act in concert, and to live and travel in society. Those which remain after the departure of the great body are only irregular stragglers. The Arabians distinguish several separate species of this insect, to which they give particular names. But

these names are not expressive of any qualities in the nature of the animal; as they respect only the delicacy ascribed to its flesh. They give the name *Muken* to the red locust, which is esteemed fatter and more succulent, than any of the others; they likewise eat the light locust; but abstain from another, called *Dubbe*, because it has a tendency to produce diarrhoea. All Arabians, whether living in their native country, or in Persia, Syria, and Africa, are accustomed to eat locusts. The Turks, on the contrary, have an aversion for this sort of food. If the Europeans express any thing of the same aversion, the Arabians then remind us of our fondness for oysters, crabs, and lobsters. A German, who had long resided in Barbary, assured us, that the flesh of this insect tasted like the small sardine of the Baltic Sea, which is dried in some towns of Holstein. We saw locusts caught, and put into bags, or on strings, to be dried, in several parts of Arabia. In Barbary, they are boiled, and then dried upon the roofs of the houses. The Bedouins of Egypt roast them alive, and devour them with the utmost voracity. We saw no instance of unwholesomeness in this article of food; Mr Forskal was indeed told, that it had a tendency to thicken the blood, and to bring on melancholy habits. The Jews in Arabia are convinced, that the fowls, of which the Israelites ate so largely in the desert, were only clouds of locusts,—and laugh at our translators, who have supposed that they found quails where quails never were. The swarms of these insects darken the air, and appear at a distance like clouds of smoke. The noise they make in flying is frightful and stunning, like that of a water-fall. When such a swarm falls upon a field, it is wasted and despoiled of its verdure. The pulse and date trees suffer greatly from the locusts; but corn, either ripe or nearly so, is too hard for their use, and they are obliged to spare it. A small insect named ARDA, of the bulk of a grain of barley (*Termes fatale*, Linn.) is another scourge of Arabia, and of hot countries in general. On account of some general resemblance, many travellers represent this insect as an ant, and speak of it under this name. Its instinct disposes it to travel only by night, thro' a sort of galleries, which it forms, as it proceeds, of fat earth. After reaching the end of its journey, it corrodes and destroys every thing, victuals, clothes, and furniture. We found an army of these in our chamber, for the first time, at Beit el Fakih. We immediately demolished the galleries which they had formed; but they, without being discouraged, or terrified at our presence, renewed their work in the night, with singular obstinacy, so that we had much ado to rid ourselves of them. They live and work together like ants. The arda is also destructive to trees, the sweetness of whose leaves and fruits gratifies its taste. These insects fix upon trees of this character, and extend their galleries from the root to the top. The inhabitants of the country have no other means for preserving their gardens from utter ruin, except to surround the trees with sheep's dung, the smell of which the arda cannot endure.—There are in Arabia many ants, but most of them are harmless as ours. From among these, however, are to be excepted two species, one of

which becomes troublesome by the voracity with which it attacks victuals, unless driven away by the odour of camphor; the other's bite is little less painful than that of the scorpion. A sort of *SCOLOPENDRA* likewise torments the inhabitants of this country, and affects those on whom it fixes with burning pains. This insect fixes all its feet into the flesh, so that it is impossible to rid one's self of it otherwise than by successively burning all the parts affected with a hot iron. The cuttle fish is dangerous to swimmers and divers, of whom it lays hold with its long claws. These do not wound, but produce swelling, internal pains, and often an incipient paralysis. Among the *TENEBRIONES* is one species which destroys reeds. Probably this small insect attacks likewise the stalks of corn, in which is observed a farina, which serves to diffuse the eggs of this insect through houses. This little animal is therefore one of the most troublesome insects in this country. The women of Arabia and Turkey make use of another tenebrio, which is found among the filth of gardens. As plumpness is thought a beauty in the east, the women, in order to obtain this beauty, swallow, every morning and every evening, three of these insects fried in butter. The Red Sea is full of marine insects; *Priapi*, *Salpa*, *Fistulares*, *Medusa*, &c. Mr Forskal became more and more convinced, in the course of his observations, that the immense numbers of these animals contribute to produce the refulgence which is perceived at night in sea water. This insect seems to be an animated phosphoric body." Mr Neibuhr concludes his account of Arabian entomology, by describing "the astonishing mass of works formed by marine insects; namely, the immense banks of coral bordering, and almost filling up the Arabic gulph. Great part of the houses in the Tehama are of coral rock. Mr Forskal used to look upon every Arabic house as a cabinet of natural history, as rich in corals as any such cabinet in Europe. The reader may therefore conceive what a variety of madrepores and millepores are to be met with in these seas. Some are so curious as to tempt us constantly to take specimens of them; but their bulk renders it impossible to carry these away. These coral rocks, rising sometimes ten fathoms above the surface of the sea, are soft under the waters: And hence, being easily wrought, they are preferred to all other stones for the purposes of building."

(12.) ARABIA, SOIL, MINERALS, &c. OF. Arabia, in general, is neither rich nor fertile. Mr Neibuhr says, "The soil of several of the countries which we visited are less favourable, than is commonly supposed, for the increase of vegetables and animals. The soil of Arabia is, through a great part of that country, dry and sandy, produces no plants, and is therefore unfit for the nourishment of animals. In the high lands of Arabia, there are as great diversities of soil as in most other cultivated countries. The most general character of the soil on these schistous hills is clay mixed with sand. But the figure of the hills is unfavourable to their fertility. They are commonly so craggy and precipitous, as to afford neither room nor soil for vegetable productions, the earth being continually washed away by the

waters. These circumstances have likewise the effect of rendering the culture of such places extremely difficult and expensive. Terraces are necessary to be formed; of which indeed the construction is sometimes facilitated by the piles of basaltic stones naturally cast into regular pentagonal figures, which are broken, from time to time, from the rocks, and serve as materials from the wall. Besides these masses there are calcareous, vitreous, and sand stones; ferruginous spars, mixed with brown or white selenite, almost transparent, a blueish gypsum, a grey schistus, and sphenoidal marcasites, in beds of grit stone; from which stones are hewn for building. Arabia affords, however, stones of greater value. The onyx is common in Yemen; and in a hill near the city of Damar is found the stone *AYEK JEMANI*, which is in the highest estimation among the Arabians. It is of a dark red, or rather a light brick colour, and seems to be a sort of carnelian. The Arabians set it in rings of bracelets, and ascribe to it the virtue of stopping the bleeding of wounds when instantly applied. Among the *Mokha*, which are, properly speaking, Italian carnelians, brought from Surat to Arabia and Europe, pieces are found which bear a perfect resemblance to this *Ayek Jemani*. We saw two in the hills, consisting almost entirely of fossiliferous limestone near Loheya, and the other in the neighbourhood of Hodeida. These masses of salt are picked up in large transparent strata, and inclosed in a crust of calcareous stone. The Arabians formerly dug up this salt, but the galleries of the mines have sunk down, and it is now neglected. We were told, however, that foreign vessels sometimes come to lade with this salt, from the hills near the isle of *Kameran*, in the neighbourhood of Hodeida. Arabia does not appear to be rich in metals. The old Greek and Latin writers go even so far as to assert that it is absolutely destitute of iron. This is not true; for grains of iron are to be seen among the sands which are washed down by the rains. Magnets are commonly to be met with in the province of Kufma; and at Saade are iron mines, which are wrought at present. However, the iron of Yemen is coarse and brittle; disadvantages which cannot be remedied. Besides, the scarcity of wood makes this iron dearer than that which is brought from distant countries. For this reason, iron is a commodity which strangers can always dispose of to advantage in the ports of the Red Sea. In Oman are many very rich lead mines. As this metal is more easily fusible, the inhabitants of this province export great plenty of it. This trade is carried on from the harbour of Maskat. As the ancients honoured one part of Arabia with the title of *Libya*, it should seem that they must have ascribed to it all possible advantages. The Greeks and Latins accordingly make ample mention of the immense quantity of gold which this country produced. In remote times possibly, when the Arabians were the factors of the trade to India, much of this precious metal might pass through Arabia into Europe; but that gold was probably the produce of the mines of India. At present, at least, there is no gold mine in Arabia. The rivulets bring down no grains of this metal from the hills; nor

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ter which, they float in a state of seeming intoxication on the surface of the water. This seems to be a sort of *nux vomica*; which is also obtained from the western coasts of India. The Arabians have little wood fit for building; their trees are mostly of a light, porous texture. The *sciera*, a new genus, described by Mr Forskal, a tree that grows on the sea shore, is so soft, that no use can be made of it."

ARABIAN ALPHABET. The Arabian alphabet consists of 28 letters; which are somewhat like to the ancient Kufic, in which character, the first copies of the Koran were written. The present characters were formed by Ebn Moklah, a learned Arabian, who lived about 300 years after Mahomet. The most ancient character peculiar to the Arabs, wherein the letters were not distinctly separate, went by the appellation of *Al Muhand*, from the mutual dependency of its letters or parts upon one another. This was neither publicly taught, nor suffered to be used, without permission first obtained. Could we depend upon what Al Firauzabadius relates from Ebn Hashem, his character must have been of a very high antiquity; since an inscription in it, according to the author, was found in Yemen, as old as the time of Joseph. Be that as it will, Moramer ben Morra of Anbar, a city of Irak, who lived many years before Mahomet, was the inventor of the present Arabic character, which Bashar ben Kerdian, who married the sister of Abu Soma, is said to have learned from the house of Anbar, and to have introduced at Mecca, but a little time before the institution of Mahometanism. Moramer's alphabet the oriental authors admit to have been very different from the ancient one of the Hamyarites, since they distinguish the Hamyaritic and Arabic pens. In Mahomet's time, the Morameric alphabet had made so small progress, that no one in Yemen could either write or read it; nay, Mahomet himself was incapable of doing either; for which reason, he was called the *illiterate prophet*. The letters of this alphabet were very rude; being either the same as, or very much like, the Kufic; which character is still found in inscriptions and the titles of old books; nay, for many years, it was the only one used by the Arabs, the Koran itself being first written therein. In order to perpetuate the memory of Moramer's invention, some now call the Arabic letters *al Moramer*, i. e. *progeny of Moramer*. The most remarkable specimens of the Kufic character (so denominated from Kufa, a city of Irak, where some of the first copies of the Koran were written) are the following: Part of that book in it on vellum, brought from Egypt by Mr Greaves; some other fragments of the same book in it published by Sir Chardin; certain passages of a MS. in the Vatican library; the legends on several Saracenic coins, dug up not many years ago, on the coast of the Baltic, not far from Dantzick; and, according to Professor Hünt, those noble remains are, or were lately to be seen in Mr Joseph Smith's valuable collection of antique curiosities. To the true origin of the ancient and modern Arabic alphabets, we must own ourselves pretty

much in the dark. See ALPHABETICAL CHARACTERS, § 1, 2, and 3.

ARABIAN HERESY. See ARABIC.

ARABIAN LANGUAGE. See ARABIANS, § 11.

ARABIAN LOGIC, that of Aristotle, as explained by Avicenna and Averrhoes. See ARABIANS, § 12.

ARABIAN MARBLE, ARABICUM MARMOR, a name given by the ancient Greeks to a species of marble, brought from Egypt and Arabia, and remarkable for its beautiful whiteness.

ARABIAN ORATORY, according to Renaudot, consisted in a luxuriancy of quaint, high-flown words, epithets, and descriptions.

ARABIAN PHILOSOPHY, PHYSIC, &c. See ARABIANS, § 12, 17, and 18.

(1.) **ARABIANS, AGRICULTURE OF THE.** In Arabia, although the government is auspicious to agricultural industry, yet Mr Niebuhr says, "the instruments of husbandry are coarse and ill made. The plough used is of a very simple structure, is drawn by oxen, and is dragged over the ground in every direction, till the soil seems to be sufficiently broken and loosened for the reception of the seed. In the neighbourhood of Bagdad, asses are yoked in the plough with oxen; and near Mosul, two mules. In cultivating their gardens, and such spots in their fields as are not accessible to the plough, the Arabians use a sort of hoe, and in digging very deep, a large crow, managed by two men, one of whom presses it in the ground, and the other draws it towards himself with cords. In many parts of Yemen, whole fields are cultivated like a garden. Agriculture is in such places, however, a very laborious task, for much care is requisite in watering the grounds. In the highland part of this province, the fields are often formed into terraces, and watered in the rainy season by canals from the hills. The inhabitants of the plain are obliged to encompass their fields with dykes, that the water may remain for some time upon the surface of the ground. The inhabitants of the upper parts collect the water necessary for their fields in dams formed at the foot of the hills. Besides private dams, there are likewise very large public reservoirs, formed by carrying a wall between two hills. In the plain of Damar, the fields are watered out of very deep draw wells, from which the water is drawn by strength of arm. It is surprising that the Arabians adopt not the hydraulic machines which are used by their neighbours in Egypt, and in India. I saw them sow in the highlands of Yemen. A peasant bearing a sackful of lentiles, dropped them here and there in the furrows, just as we sow peas in our gardens; and, as he went on, covered the seed by pushing in the mould with his feet on both sides. In other places, the sower followed the ploughman, and cast the seed into the furrow, which the other returning, covered up with his plough. Both these modes of sowing are exceeding troublesome; for the sower must make as many turns backwards and forwards, as there are furrows; but there is a saving in the quantity of the seed, no part of which can be withered by the winds, or pecked up by birds. In Arabia in general, only a small quantity of seed is used; the peasant, trusting to the resem-

city of the seasons, does not expose his grain to perish in the ground, by sowing it at an improper time. This is another proof of the fallacious nature of inferences concerning the fertility of the ground, deduced from the proportion between the seed and the increase. In some districts in Yemen, maize and durra are planted with the hand. I saw likewise, in the highlands, between Mofhak and Sehan, some fields, in which those grains grew in rows, like our cabbages in Europe. They were the finest fields I ever saw in my life. The stalks were all of the same height, and every plant was thriving and luxuriant. In adjoining fields, were some unpromising enough crops of the same grain, which is a proof that the Arabian peasants are not all alike industrious. The corn fields in the places about Beit el Fakih were also full of cockle weeds, and irregularly sown. Near Mount Mharras, I saw a peasant draw furrows with a small plough, between straight rows of corn, of which the stalks were from nine to ten inches high. His oxen were so yoked, that they passed between the rows without treading down any of the plants. The intention of this piece of labour was to destroy weeds, to cover the roots of the plants with earth, and to open the soil for the reception of moisture. The weeds which still remained, were pulled up with the hand, and given to cattle. Thus the husbandry of Tull and Du Hamel, although novel in Europe, is very old in Arabia."

(2.) ARABIANS, ASTRONOMY OF THE. "The modes of the division of time in use among the Arabians show how little progress this nation have made in astronomy. They know indeed a little of its elements; but this, it should seem, rather from tradition, than from any observations of their own. Their day consists of 24 hours, and lasts from sun setting to sun setting. Their hours are therefore of uncertain duration, and vary with the length of the natural day, or the time during which the sun is above the horizon. As they are strangers to the use of watches, none of them has any precise idea of the duration of their hours, but, like the peasants of Europe, they distinguish the different parts of the day by vague, uncertain denominations, which only approach near the truth. Their year consists of 12 lunar months. They begin the month with the new moon; and, when the sky is so clouded that they cannot see her rise, then they make no difficulty of beginning the month a day or two later. Thus all their months go the round of the seasons; and this division of the year marks out no period for the labours of husbandry, or any of the other employments of civil life. To obviate this inconvenience, the learned reckon by other months corresponding to the course of the solar year, and consisting of the same number of days as ours. In Arabia, as in other Mahometan countries, two great festivals are annually celebrated; that of offerings, called Arafa or Corban, and that of Beiram, immediately after Ramadan. The reckoning by lunar months occasions these festivals to alternate through the whole year. When Ramadan falls in summer, it is excessive: for the people, however em-
our, dare taste nothing, even in the

longest days of the year, till the sun is down.—At Constantinople, the sultan's astronomer composes every year a portable almanac, of which there are at least several copies made. But, in Egypt and Arabia, this mode of acquainting the people with the return of the festivals, and the progress of the seasons, has not been thought of; and so ignorant are they on this head, that the same festival is sometimes two days earlier, and sometimes as much later, and often on different days at different places. A cloud hiding the new moon from one city, while she is seen by another, will be sufficient to produce these irregularities. It is not for want of a passion for astronomy that the Arabians have made so little progress in this science. But they want books and instruments. They have the work of Abdarachman es Sufi upon the constellations, and the tables of Eliah Beigh, by which some astronomers in the great towns are enabled to calculate eclipses. Their instruments are a celestial globe of copper, beset with golden stars, which they well know how to use; an astrolabe of brass, and a quadrant of wood, to take altitudes, and to determine the hour for prayer. It is known to the astrologers, and to all men of sense in Arabia, that eclipses are owing to the interception of the light of one heavenly body by the interposition of another.—But the people still maintain the superstitious opinion, that a huge fish pursues the planet which is eclipsed. To chase away the fish, women and children get upon the roofs of the houses, and make a noise during the eclipse by beating upon brazen kettles and basins. The rise of this custom is referred to an Arabian astronomer, who persuaded the people of this fable, that they might make a noise great enough to reach the ears of the caliph of Persia, who had refused to credit that astronomer's prediction of the eclipse. The Arabians seem to study astronomy solely with a view to their success in the cultivation of astrology, a science highly esteemed and very lucrative in the East. The Koran expressly forbids Moslems to pry into futurity by any form of divination; and the most famous commentators for this reason represent the study of astrology as criminal. But, notwithstanding the decision of these doctors, the Mahometans are all much attached to this science."

(3.) ARABIANS, CHARACTER OF THE. The following character of the Arabians is drawn by Mr Niebuhr. "Climate, government, and education, are, undoubtedly, the great agents which form and modify the characters of nations. To the first of these the Arabs owe their vivacity, and their disposition to indolence; the second increases their laziness, and gives them a spirit of duplicity; the third is the cause of that formal gravity which influences the faculties of their mind, as well as their carriage and exterior aspect. No two things can differ more than the education of the Arabs from that of the Europeans. The former strive as much to hasten the age of maturity, as the latter to retard it. The Arabs are never children; but many Europeans continue children all their life. In Arabia, boys remain in the Haram, among the women, till the age of 5 or 6, and during this time follow the childish amusements

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(5) ARABIAN, DISEASES OF THE. Temper.

rance and regularity are the surest preservatives of health. The Arabians are accordingly free from many diseases common in Europe. They are, however, subject to some diseases peculiar to their climate. "The leprosy (says Mr Niebuhr) seems to have been always an endemic disease in Arabia; for there is one species of leprosy which authors distinguish by the character of Arabian. Three different varieties of this disease are known here at present; of which two, named *Bobak* and *Barras*, are rather disgusting than dangerous; but the 3d called *Juddam*, is very malignant, and apparently infectious. This latter exhibits the same symptoms which the English physician *Hillary* ascribes to what he calls *the leprosy of the joints*. The Turks, from a misconception of the doctrine of predestination, use no precautions against the plague; but the Arabians, although true Mussulmans, are more careful in respect to the leprosy.—The last prince of Abu Schazhr used to send to the isle of Bahrein all who were attacked with the leprosy, or with venereal complaints. At Basra, lepers are shut up in a house by themselves; and there is a quarter in Bagdad surrounded with walls, and full of barracks, to which the lepers are carried by force, if they retire not thither voluntarily; but government does not seem to provide with any care for the maintenance of those lepers. They come out every Friday to the market place to ask alms. It is said that these wretched creatures are much inclined to sooth their misery in the enjoyments of love. Not many years since a leper employed a cruel stratagem in order to obtain a woman with whom he was in love.—He wore a fine shirt for a few days, and then caused it to be privately sold, for a trifling price, to the object of his passion. When he knew that the leprosy had made its appearance upon her, he informed against her, and procured her to be shut up with himself in the barracks. In Arabia, the leprosy is thought to be occasioned chiefly by the unwholesome food, especially putrid fish, used by the people. Mr Forikal has left a description of the different varieties of the leprosy, which must be valuable to physicians. A disease very common in Yemen is the attack of the Guinea-worm, or the *Vena Medinenfis*, as it is called by the physicians of Europe. This disease is supposed to be occasioned by the use of the putrid waters, which people are obliged to drink in several parts of Yemen; and for this reason the Arabians always pass water, with the nature of which they are unacquainted, through a linen cloth, before drinking it. When one unfortunately swallows any of the eggs of this insect, no immediate consequence follows; but after a considerable time the worm begins to shew itself through the skin. Our physician, Mr Cramer, was, within a few days of his death, attacked by five of these worms at once, although this was more than five months after we had left Arabia. In the isle of Kerek, I saw a French officer, named Le Page, who, after a long and difficult journey, performed on foot, and in an Indian dress, between Pondicherry and Surat, through the heat of India, was busy extracting a worm out of his body. He supposed that he had been drinking bad water in the country of the
—This disorder is not dangerous, if the

person affected can extract the worm without breaking it. With this view, it is rolled on a small bit of wood, as it comes out of the skin. It is slender as a thread, and two or three feet long. It gives no pain as it makes its way out of the body, unless what may be occasioned by the cure, which must be taken of it for some weeks. If unfortunately it is broken, it then returns into the body and the most disagreeable consequences ensue, palsy, a gangrene, and sometimes death."

(6.) ARABIANS, DOMESTIC LIVES OF THE
"Arabia affords no elegant or splendid apartments for the admiration of the traveller. The houses are built of stone, and have always terrace roofs. Those occupied by the lower people are in huts, having a round roof, and covered with a certain herb. The huts of the Arabs on the banks of the Euphrates are formed of branches of the date tree, and have a round roof covered with rush mats. The tents of the Bedouins are likewise those of the Kurdes and Turcomans. They have the aspect of a tattered hut. They are formed of coarse stuffs prepared by the women. The palaces of Arabians of rank display no external magnificence. Ornaments are not to be expected in the apartments of men who are strangers to luxury, except what consists in the number and the value of their horses, servants, and arms. The poor spread their floors with straw mats, and the rich with fine carpets. No person ever enters a room, without having first put off his shoes. The men of every family always occupy the front part of the house, and the women the back part. If the apartments of the men are plain, those of the women are, on the contrary, most studiously set off with decorations. Of this I saw a specimen in a haram, which was nearly finished for a man of rank. One room in it was wholly covered over with mirrors; the roof, the walls, the doors, the pillars, presented all so many looking glasses. The floor was set with sofas, and spread with carpets. Arabians, in circumstances which admit of their having separate apartments for the females of the family, are careful, whenever they call a stranger into the house, to enter before him, and cry *tarik*, retire. Upon this notice, the women instantly disappear. It is reckoned highly impolite to salute a woman, or even to look her full in the face. The retired life of the women imposes them to behave respectfully to the other sex. I met a Bedouin lady, who, purely out of respect, left the road, and turned her back upon me; and I several times have seen women kiss the hands of a man of distinction, or kneel to kiss his feet. They great often have in their halls basins with *d'eau*, to cool the air. As the people of the east wish to keep their floors very clean, they spit very little, although they smoke a great deal. Yet to spit is not reckoned a piece of impoliteness. Some persons of rank use a spitting box, and others put on the bottom of the wall, behind the cushions on which they sat. The use of chairs is unknown in the east. The Arabians practise several different modes of sitting. When they wish to be very much at their ease, they cross their legs under the body. This mode of sitting is the most commodious for people who wear long clothes, and wide breeches, without any confining ligature."

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to carry away the most precious. . . . them a box filled with
the most precious. . . . I put a bit of this wood
in my pocket, and I carried it home with me, and it communicates to me
the most precious. . . . Instead of taking opium,
they eat it, and it is the buds of a
tree, which are brought in from the
hills of Yunnan. . . . People who have good
digestion, being able to get some from the
for the use of old men, it is a great deal of
it is said to be from India, merely that they
are chewed, for they have a disagreeable
and are unfavourable to sleep. The lower
are fond of raising their spirits to a state of
excitement. As they have no strong drink, they
use opium. They eat the leaves of a
tree, which is called the leaves of
of hemp. This excites the spirits, and
them into a state in which delightful visions
appear before the imagination. As the people of the
figure themselves upon the ground when they
some manner of eating is compulsory to this
of the room, put upon this cloth a small
only one foot high, and upon the table
a round plate of tinned copper. Upon this
different copper dishes, neatly tinned within
without. Instead of table napkins, Arabians
use a long linen cloth, which they fold at table
ends. . . . Where this linen cloth is
used, every one uses a small piece of
one. They use no knives nor forks. The
sometimes wooden or horned spoons, but
Arabians use their fingers with great dexterity,
at all dishes with the hand. We were to
the standard of our own manners, the
upon table. I could not help laughing
at the behaviour of the first Turk I saw
who was the comptroller of the customs of
Bardisland, in company with whom I hap-
pened to sit down at the French Consul's table. He
had his napkin with his fingers, and wiped
with his hand. . . . I never recalled when
I became more familiar with the life of the
people. They know not the use of glass napkins,

we emptied more than 14 plates within less than 30 minutes. The Arabs, repeat always a short prayer before sitting down to a meal. "In the morning," says the most intelligent of them, "When any one has done eating, he rises without delay, and says, 'God be praised.'" They drink little while they eat, but, as they rise from the table, after washing, they drink some cold water and a cup of coffee. The Arabians are as ardent smokers as the Turks of coffee, which they call *Kawa*. They are also great drinkers of wine, which we have adapted from them. The only difference between their mode of preparing it and ours, is, that they, instead of grinding their coffee beans, pound them in a mortar. The pounding seems better to express the oily parts of the bean, which gives it a more peculiar relish. They always drink their coffee with sugar, and in such strength that the Mussulmans are forbidden the use of all passionately eating liquors, yet many of them are passionately fond of them, and drink them privately, and at night, in their own houses. On the frontiers of Arabia, where there are Christians, both wine and strong liquors are to be found; but in Arabia, north of the Tiber, and in the interior, there are no Jews of Sana, who have great plenty and of an excellent quality. They supply their countrymen; but, having no casks, they are obliged to carry their wine and brandy in copper vessels, which renders the use of them dangerous to the health. The use of opium sometimes brings attack from India to Mokha. The Arabs are, in general, a sober, frugal nation, which is probably the cause of their longevity, and seemingly stunted growth. Their usual articles of food are rice, pulse, milk, butter, and *keznah*, or whipped cream. They are not without animal food, but they seldom eat of it. It is their custom, very unwholesome in itself, but common to the Moors, to eat all kinds of species of food nearly here, and so it the Arabians of the desert chiefly live. The common people in Arabia have little other food, but bad bread made of dates, a lot of coarse millet, by kneading it with camel's milk, oil, butter, or grease. The modes of bathing are different in different places of Arabia.



In the ship in which we sailed from Jidda to Lohaya, there was a sailor, whose task every afternoon was to prepare durra for next day's bread. He bruised the grain between two stones, one of which was convex, the other concave. Of the meal thus prepared, he formed dough, and then divided into small cakes. In the meantime, the oven was heated; but it was simply an earthen pot glazed; and a fire of charcoal was kindled up within it; the cakes were laid against the sides of the pot, without removing the coals, and in a few moments the bread was taken up half roasted, and was eaten hot. The Arabians of the desert used a heated plate of iron, or a gridiron, in preparing their cakes. When they have no gridiron, they roll their dough into balls, and put it either among live coals, or into a fire of camel's dung, where they cover it till it is penetrated by the heat. They then remove the ashes, and eat the bread, while it is scarcely dry, and still hot. In the towns, the Arabians have ovens like ours; their bread is of barley meal, and of the form and thickness of our pancakes; but they never give it enough of the fire."

(7.) ARABIANS, EDUCATION OF THE. "The monarchs of the east do not take the same care, for the encouragement of science as the sovereigns of Europe. In Arabia, there are neither numerous academies, nor men of profound learning. Yet the Arabian youth are not entirely neglected. In the cities, many of the lowest of the people are taught to read and write; the same qualifications are also common among the Schiechs of the desert, and in Egypt. Persons of distinction retain preceptors in their families to instruct their children and young slaves; for they bring up such of their young slaves as appear to possess abilities, like children of the family. In almost every mosque is a school, denominated *Maddraffe*, having a foundation for the support of teachers, and the entertainment and instruction of poor scholars. In great towns are likewise other schools, to which people of middle rank send their children to receive religious instruction, and to learn reading, writing, and arithmetic. No girls attend these schools; they are privately taught by women. There are in some great towns in Arabia, colleges in which astronomy, astrology, philosophy, and medicine are taught; in these the Arabians, although possessed of natural abilities, have for want of good books and masters, made but little progress. In the dominions of the Imam, there have long been two famous academies; one at Zebid for *Sunnites*, and the other at Damar for the *Zeidites*. The interpretation of the Koran, and the study of the ancient history of the Mahometans, are the principal employments of men of letters among the Arabians. These studies take up much time; for the student must not only acquire the ancient Arabic, but also make himself familiar with all the commentators on the Koran, the number of whom is very considerable. All men of letters undergo a public examination, before they can be promoted to any employment, civil or ecclesiastical. Yet these examinations are surely conducted with partiality; for many persons, indifferently qualified, rise to considerable offices,

while men of merit are often obliged to act as transcribers or schoolmasters.

(8.) ARABIANS, FASHIONS AND DRESS OF THE. "There is a great variety in the national dress of the Arabians, and various fashions prevail among them. Nothing can be more inconvenient or expensive than the head-dress worn by Arabians of fashion. They wear *fifteen caps*, one over another, some of which are indeed of linen, but the rest of thick cloth or cotton. That which covers all the rest is usually richly embroidered with gold and has always some sentence of the Koran embroidered upon it. Over all these caps they wear a large piece of muslin, called a *Sasch*, ornamented at the ends, which flow loose upon the shoulders, with silk or golden fringes. As it must be very disagreeable, in a hot country, to have the head always loaded in this manner, the Arabians when in their own houses, or with intimate friends, lay aside this useless weight, all to one or two of the caps. But, before persons whom they are obliged to treat with ceremony or respect, they dare not appear without their turbans. Those who desire to pass for men of learning, display their pretensions by the bulk of their turbans. Arabians of rank wear one piece of dress, which is not in use among the other inhabitants of the East. This is a piece of fine linen upon the shoulders, which seems to have been originally intended to shelter the wearer from the sun and rain, but is now merely ornamental. The common class of Arabs wear only two caps, with the *Sasch* carelessly bound on the head. Some have drawers and a shirt; but the greater number have only a piece of linen about their loins, a large girdle with the *Jambr*, and a piece of cloth upon the shoulders; in other respects they are naked, having neither shoes nor stockings. In the highlands where the climate is colder, the people wear flannel. The scanty clothes, which they wear through the day, are also all their covering by night; the cloth swaddled about the waist serves for a mattress; and the linen garment worn about the loins is a sheet to cover the Arab while he sleeps. The highlanders, to secure themselves from being infested by insects, sleep in sacks. Persons in a middle rank of life wear, instead of shoes, sandals, being merely single soles, or sometimes thin pieces of wood, bound upon the foot with a strap of dressed leather. People of better fortune use slippers, like those worn through the rest of the East; and this is also the dress for the feet worn by the women. The ordinary dress of the Arabs is simple enough; but they have also a sort of great coat, without sleeves, called *Abba*, which is simpler still. In the province of Lachem the *Abba* is commonly used by both sexes. In several places in Arabia, the men wear no drawers; but these with a large shirt are all the dress used by the lower women. In the Tehama, women of this class wrap a linen cloth about their loins in the manner of drawers. The women of Hejaz veil their faces, like those of Egypt, with a narrow piece of linen, which leaves both the eyes uncovered. In Yemen, they wear a larger veil which covers the face so entirely, that the eyes can hardly be discerned. At Sana and Mecca,

in, they cover the face with a gauze veil, which is often embroidered with gold. They all wear rings on their fingers, arms, nose, and ears. They stain their nails red, and their hands and feet of a brownish yellow colour, with the juice of the plant *Eibenne*. The circle of the eyes, and even the eye-lashes, they paint black, with a preparation of lead ore called *Kochbel*. The men sometimes imitate this mode of painting the eyes with *Kochbel*; but persons of sense laugh at so effeminate a practice. The women of Yemen also make black punctures in their face to improve their beauty. Their natural complexion is a deep yellow: but, among the hills, are persons of fair complexions and fine faces, even among the peasantry. In the towns, women, who think themselves handsome, lift up their veils to shew their faces, whenever they think they can do it unobserved. Fashion shews its influence, in the modes in which the hair and beard are worn in Arabia. In the Imam of Sana's dominions, all men, of whatever station, shave their heads. In other parts of Yemen, all men, even the Schiechs, preserve their hair, wrap it in a handkerchief, and knot it up behind; caps and turbans are not in use there. Some of the highlanders keep their hair long and loose, and bind the head with small cords. Every man, without exception, wears the beard of its natural length; but the Arabs keep their mustachios very short. In the highlands of Yemen, where few strangers are ever seen, it is disgraceful to appear without a beard. Our servant wore only his mustachios; and those good highlanders judged that we had shaven him by way of punishment for some fault. The Arabians have all black beards. Some old men, when their beards are whitened by time, dye them red; but this practice is generally disapproved. The Jews, throughout the East, preserve their beards from their youth. They wear the beard not in the same form as the Mussulmans and Christians, shaving none of it about the temples and the ears. To distinguish themselves still more from the rest of mankind, they retain two tufts of hair hanging over their ears. The Jews of Arabia resemble those of Poland; only they have a more decent and less beggarly aspect. They dare not wear the turban, but are obliged to content themselves with a small bequest. Neither are they suffered to dress in any colour but blue; all their clothes are of blue cloth. There are many *Banians* settled in Arabia. Their dress consists of a turban of a particular form, a piece of linen upon the shoulders, another piece of linen fixed by a string about their loins, and slippers. Some also wear over these pieces of dress a long white robe, which plaits upon the shoulders, and sits close upon the body and the arms. These Indians used to dress entirely in white; but they received, some years since, an order from Sana, enjoining them to wear red clothes. To obtain a dispensation from this change of dress, they paid a considerable sum to the Imam, and the order was revoked. They were soon after enjoined, by another edict, to wear a red, instead of a white turban: But, not choosing to buy off in this instance, they obeyed, and now wear a red turban, with the rest of their dress white.

(9.) ARABIANS, HOSPITALITY OF THE. Mr

Niebuhr, after describing the politeness of the Arabians, contrasting it with the rudeness of the Turks, and mentioning as a proof that the Arabian governments wish to obtain the friendship of the Europeans, their exacting easier duties from them, than from other nations, adds,—“The chief part of Arabian politeness is hospitality; a virtue which is hereditary to the nation, and which they still exercise in its primitive simplicity. An ambassador sent to any prince or Schiech has his expences defrayed, and receives presents, according to the custom of the East. A traveller of any distinction, who should go to see any great Schiech in the desert, would receive the same treatment. I have spoken occasionally of the *Kans* and *Man-sales*, or houses of hospitable entertainment, in which I was received on my travels. What appears to distinguish the Arabians from the other inhabitants of the East, is, that they exercise hospitality to all, without respect of rank or religion. The Arabians invite all who come in while they are at table, to eat with them, whether great or small, Mahometans or Christians. In the caravans, I have often had the pleasure of seeing a poor muleteer press passengers to share his meals, and, with an air of satisfaction, distribute his little store of bread and dates to all who would accept any part of it from him. I have, on the other hand, been shocked at the behaviour even of rich Turks, who retired to a corner to eat by themselves, that they might avoid asking any one to partake of their fare. When a Bedouin Schiech eats bread with strangers, they may trust his fidelity, and depend upon his protection. A traveller will always do well therefore to take an early opportunity of securing the friendship of his guide by a meal. When two Arabians salute each other, he who speaks first lays his right hand on his heart, and says, *Salam Aleikum*, or, “peace be with you;” the other replies, *Aleikum essalam*, or, “with you be peace.” Old persons commonly add their blessing, or rather, “the mercy and blessing of God.” The Mahometans of Egypt and Syria never salute the Christians in these words; but content themselves with saying to them, *Sebachel chair*, “good day,” or, *Sabheb salamah*, “friend, how art thou?” In Yemen, this distinction is not observed.”

(10.) ARABIANS, INDEPENDENCE OF THE.—There is the strongest reason to believe, that the inhabitants of the peninsula properly called ARABIA, have remained independent of every conqueror that the world hath yet produced. The perpetual independence of the Arabs, indeed, has been the theme of praise among strangers and natives. The kingdom of Yemen it is true, has been successively subdued by the Abyssinians, the Persians, the sultans of Egypt, and the Turks; the holy cities of Mecca and Medina have repeatedly bowed under a Scythian tyrant; and the Roman province of Arabia embraced the peculiar wilderness in which Ismael and his sons pitched their tents in the face of their brethren. Yet these exertions are temporary or local; the body of the nation has escaped the yoke of the most powerful monarchies: the arms of Sesostris and Cyrus, of Pompey and Trajan, could never achieve the conquest of Arabia; the present sovereign

reign of the Turks may exercise a shadow of jurisdiction, but his pride is reduced to solicit the friendship of a people whom it is dangerous to provoke, and fruitless to attack. The obvious causes of their freedom are inscribed on the character and country of the Arabs. Many ages before Mahomet, their intrepid valour had been severely felt by their neighbours, in offensive and defensive war. The patient and active virtues of a soldier are insensibly nursed in the habits and discipline of a pastoral life. The care of the sheep and camels is abandoned to the women of the tribe; but the martial youth, under the banner of the emir, is ever on horseback, and in the field, to practise the exercise of the bow, the javelin, and the scymetar. The long memory of their independence is the firmest pledge of its perpetuity; and succeeding generations are animated to prove their descent and to maintain their inheritance. Their domestic feuds are suspended on the approach of a common enemy; and in their last hostilities against the Turks, the caravan of Mecca was attacked and pillaged by 80,000 of the confederates. When they advance to battle, the hope of victory is in the front; and in the rear, the assurance of a retreat. Their horses and camels, who in eight or ten days, can perform a march of 400 or 500 miles, disappear before the conqueror; the secret waters of the desert elude his search; and his victorious troops are consumed with thirst, hunger, and fatigue, in the pursuit of an invisible foe, who scorns his efforts, and safely reposes in the heart of the burning solitude. The arms and deserts of the Bedouins are not only the safeguards of their own freedom, but the barriers also of the Happy Arabia, whose inhabitants, remote from war, are enervated by the luxury of the soil and climate. The legions of Augustus melted away in disease and latitude; and it is only by a naval power that the reduction of Yemen has been successfully attempted. When Mahomet erected his holy standard, that kingdom was a province of the Persian empire; yet seven princes of the Homerites still reigned in the mountains; and the vicegerent of Chosroes was tempted to forget his distant country, and his unfortunate master. The historians of the age of Justinian represent the state of the independent Arabs, who were divided by interest or affection in the long quarrel of the East; the tribe of Gassan was allowed to encamp on the Syrian territory: the princes of Hira were permitted to form a city about forty miles to the southward of the ruins of Babylon. Their service in the field was steady and vigorous; but their friendship was venal, their faith inconstant, their enmity capricious: it was an easier task to excite them to disarm these roving barbarians; and, in the familiar intercourse of war, they learned to see, and to despise, the splendid weakness, both of Rome and of Persia. From Mecca to the Euphrates, the Arabian tribes were confounded by the Greeks and Latins, under the general appellation of Saracens; a name which every Christian mouth has been taught to pronounce with terror and abhorrence. The slaves of domestic tyranny may vainly exult in their national independence; but the Arab is personally free; and he enjoys, in some degree, the

benefits of society, without forfeiting the prerogatives of nature. In every tribe, superstition, or gratitude, or fortune, has exalted a particular family above the heads of their equals. The dignities of schiech and emir invariably descend in this chosen race; but the order of succession is loose and precarious; and the most worthy or aged of the noble kinsmen are preferred to the simple, though important, office of composing disputes by their advice, and guiding valour by their example. The momentary junction of several tribes produces an army: their more lasting union constitutes a nation; and the supreme chief, the emir of emirs, whose banner is displayed at their head, may deserve, in the eyes of strangers, the honours of the kingly name. If the Arabian princes abuse their power, they are quickly punished by the desertion of their subjects, who had been accustomed to a mild and parental jurisdiction. Their spirit is free, their steps are unconfined, the desert is open, and the tribes and families are held together by a mutual and voluntary compact. The softer natives of Yemen supported the pomp and majesty of a monarch; but if he could not leave his palace without endangering his life, the active powers of government must have been devolved on his nobles and magistrates. The cities of Mecca and Medina present, in the heart of Asia, the form, or rather the substance of a commonwealth. The grandfather of Mahomet, and his lineal ancestors, appear in foreign and domestic transactions, as the princes of their country; but they reigned, like Pericles at Athens, or the Medic at Florence, by the opinion of their wisdom and influence was divided with their patrimony; and the sceptre was transferred from the uncles of the prophet to a younger branch of the tribe of Koreish. On solemn occasions, they convened the assembly of the people; and, since mankind must be either compelled or persuaded to obey, the use and reputation of oratory among the ancient Arabs, is the clearest evidence of public freedom. But their simple freedom was of a very different cast from the nice and artificial machinery of the Greek and Roman republics, in which each member possessed an undivided share of the civil and political rights of the community. In the more simple state of the Arabs, the nation is free, because each of her sons disdains a base submission to the will of a master. His breast is fortified with the austere virtues of courage, patience, and sobriety; the love of independence prompts him to exercise the habits of self command; and the fear of dishonour guards him from the meaner apprehensions of pain, of danger, and of death. The gravity and firmness of the mind is conspicuous in his outward demeanor: his speech is slow, weighty, and concise; he is seldom provoked to laughter; his only gesture is that of stroking his beard, the venerable symbol of manhood; and the sense of his own importance teaches him to accost his equals without levity, and his superiors without awe. The liberty of the Saracens survived their conquests: the first khalifs indulged the bold and familiar language of their subjects: they ascended the pulpit to persuade and edify the congregation; nor was it before the seat of empire was removed to the Ti-

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A high-contrast, black and white photograph of a large, dark, rectangular object, possibly a piece of machinery or a large box, with a lighter, textured surface on the right side. The image is oriented vertically.

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men, enjoyed in power. The nobility, but only on the chiefs of *Hajjats*. They enjoy privi-
lages of the nation. The history of the nation belongs to certain
families, therefore, branches upon advantages theirs. What adds to the
own Schiebs have of their incommensurable, and not to
foreign prince, or even by
s founded on the customs of
who know no distinction of
heads of families, no limit
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not only in countries where the
first class, enjoying certain
rich may be equally conferred on
nobility may be compared
he clans among the Scotch high-
in a very similar condition with
honours and authority. The de-
ahomet held, with some reason,
among the great families in Arabia,
spring from one of the noblest fa-
mily, and rose to the rank of a
the first possession of a dealer in
his to have been a Schiech of the
pure nobility of his nation. It may
however, from the singular veneration
his family are held, that religious
contributed to gain them the pre-
dilection they hold, above even the most
foreign houses. A fact naturally respects
ity of their founder, as a race bearing
character of sanctity. These descen-
Mahomet have received different titles.
they are called Sherries, or *Sejids*; in
metan countries situate northward, Sher-
Emirs; and in the Arabian colonies in
s, simply Sejids. The prince of *Heraclia*,
rulers of Persia, takes the title of *Mahomet*,
us, I believe, been also assumed by the
of Morocco. In some countries, this

was nature. I learned that Sherries are constantly
devoted to a military life, and are descended from
Hajjats; but that the Sejids are the posterity of
Hajjats, and follow the pursuits of trade and
science, although they have sometimes risen to so-
vereign power in some parts of Arabia. There
are, in all Mahometan countries, an astounding
number of Sherries. I saw whole villages peo-
pled with this family. To those who know
not in what manner this title is transmitted, the
numbers of those who enjoy this high rank must
undoubtedly appear surprising; but polygamy na-
turally multiplies families, till many of their bran-
ches sink into the most wretched misery. In my
account of *Ysrahel*, I have mentioned my acquain-
tance with a Sherrie in that city, who was in
extreme poverty. A peculiar custom tends to the
farther increase of the race of Sherries. The son
of a woman of the family of Mahomet is esteem-
ed a Sherrie, and transmits the honour to all his
posterity. I travelled through Anatolia with a
Turk, who was called simply *Sejidi*, and wore
the common turban, while his son was honoured
with a green turban, and with the title of Sher-
rie, because his mother was a *Sherrie*. Other
similar instances came within my knowledge in
the provinces of Turkey; and, from various cir-
cumstances, I was led to infer, that many per-
sons enjoy this title who are not at all connected
with the prophet's family. The genuine Sher-
ries, to strengthen their party against the Ca-
liph, have acknowledged kindred with various
powerful families who were entire strangers to
them. Mr Niebuhr also tells us that the tribe
of *Koraiscu* and 24 other families claim their
hereditary distinction.

(16.) ARABIANS, OCCULT SCIENCES OF THE.
Of these sciences, Mr Niebuhr justly observes, "a
description would be too humiliating, did it not
afford consolation, by shewing from what end,
less absurdities we are saved by the study of sound
philosophy. Those pretended occult sciences are
in high estimation among the Arabians. Nor
dare practise them, unless previously authorised
by a master in the art, or, as the Arabians say,
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wild hopes. It should seem, that the idea of the philosopher's stone is originally oriental, and has been brought westward, like many other foolish fables."

(17.) ARABIANS, PHILOSOPHY OF THE. The philosophy of the Arabians, before Mahomet, was Sabian, and included the system and ceremonies of that sect of idolaters. This it was that Mahomet set himself to decry; and he is even said by some to have carried his opposition so far, as to prohibit, if not punish, all study of philosophy. His followers, by degrees, got over this restraint; the love of learning increased; till, under the memorable caliphate of Al-Maimon, Aristotle's philosophy was introduced among them; and from them propagated, with their conquests, through Egypt, Africa, Spain, and other parts. As they chose Aristotle for their master, they chiefly applied themselves to that part of philosophy called *logic*, and thus became proficient in the knowledge of words rather than things.—Whence they have been sometimes denominated, *masters of the wisdom of words*; sometimes the *linguists*. Their philosophy was involved in great arbitrary terms and notions, and their demonstrations drawn from thence as from certain principles, &c.

(18.) ARABIANS, PHYSIC OF THE. Their physicians succeeded the Grecian; and their physicians added down the art to us, having made considerable improvements, chiefly in the pharmaceutical and chemical parts. It is certain we owe to them most of our spices and aromatics, as nutmegs, cloves, mace, and other matters of the produce of India. We may add, that most of the bitter purgatives were unknown to the Greeks, but introduced by the Arabs, as manna, senega, rhubarb, tamarinds, cassia, &c. They likewise brought sugar into use in physic, where, before, only honey was used. They also found the art of preparing waters and oils, of divers simples, distillation and sublimation. The first notice of the small-pox and the measles is likewise owing to them. The restoration of physic in Europe took its rise from their writings. M. Le Clerc has made a sketch, and Dr Freind an ample history, of the Arabian physic. We have also a notitia of the Arabian physicians by Fabricius. Inoculation for the small-pox has been in use from time immemorial among the Bedouins. Mothers perform this operation on their children, opening the skin of the arm with the prickle of a thorn.

(19.) ARABIANS, POETRY OF THE. Their poetry may be divided into two ages. The ancient according to Vossius, was no other than rhiming; as a stranger to all measure and rule; the verses loose and irregular, confined to no feet, number of syllables, or any thing else, so that they rhimed at the end; oftentimes all the verses in the poem ended with the same rhyme. It is in such verse that the alcoran is said to be written. The modern Arabian poetry takes its date from the caliphate of Al Raschid, who lived toward the close of the eighth century. Under him poetry became an art, and laws of prosody were laid down.—Their comparisons, in which they abound, are taken, with little choice, from tents, camels, hunting, and the ancient manners of the Arabs. Niebuhr relates an anecdote which shows the

high esteem the Arabians have for poetical genius. "A Schiech of Dsjof (he says) was, a few years since, imprisoned at Sana. The Schiech, observing a bird upon the roof of a house, recollected the opinion of those pious Mussulmans, who think it a meritorious action to deliver a bird from a cage. He thought that he himself had as good a right to liberty as any bird, and expressed this in a poem, which his guards got by heart, and which becoming generally known, at length reached the monarch's ears, who was so pleased with it, that he set the Schiech at liberty, although he had been guilty of various acts of robbery."

(20.) ARABIANS, RELIGIONS AMONG THE. The ancient religion of the Arabs, as well as of the Indians, consisted in the worship of the sun, the moon, and the fixed stars; a primitive and specious mode of superstition. Sabianism was early diffused over Asia by the science of the Chaldeans and the arms of the Assyrians. From the observations of 2000 years, the priests and astronomers of Babylon deduced the eternal laws of nature and providence. They adored the seven gods or angels who directed the course of the 7 planets, and shed their irresistible influence on the earth. The attributes of the 7 planets, with the 12 signs of the zodiac, and the 24 constellations were represented by images and talismans; the 7 days of the week were dedicated to their respective deities; the Sabians prayed thrice each day; and the temple of the moon at Haran was the term of their pilgrimage. But the flexible genius of the Sabian faith was always ready either to teach or to learn. The altars of Babylon were overturned by the Magians; but the injuries of the Sabians were revenged by the sword of Alexander; Persia groaned 500 years under a foreign yoke; and the purest disciples of Zoroaster escaped from the contagion of idolatry, and breathed with their adversaries the freedom of the desert. Seven hundred years before the death of Mahomet the Jews were settled in Arabia: and a far greater multitude was expelled from the holy land in the wars of Titus and Adrian. The industrious exiles aspired to liberty and power: they erected synagogues in the cities and castles in the wilderness; and their Gentile converts were confounded with the children of Israel, whom they resembled in the outward mark of circumcision. The Christian missionaries were still more active and successful: the Catholics asserted their universal reign; the sects whom they oppressed successively retired beyond the limits of the Roman empire, and fled to the happy Arabia, where they might profess what they believed, and practise what they professed. The Marcionites and Manichæans dispersed their phantastical opinions and apocryphal gospels; the churches of Yemen, and the princes of Hira and Gassan, were instructed in a purer creed by the Jacobite and Nestorian bishops. Such was the state of religion in Arabia previous to the appearance of Mahomet. "It might be expected (says Mr Niebuhr) that the Mahometan religion should be preserved in its highest purity in Arabia, which was its cradle; and that no contrariety of opinions, or diversity of sects, should have arisen there. An old tradition records a saying of Mahomet's, from which he appears to have foreseen that it was impossible for

for his followers to remain in perpetual harmony of doctrine and worship. He is said to have predicted that his new religion should be divided into seventy different sects, as the Christians of his time were." He adds that this prediction is in part accomplished; there being many different Mahometan sects in Arabia. Of these he enumerates 13, viz. those of Sunni, Schya, Zeidi, Beiali, Messalich, Mecrami, Dsjedsjal, Schabreari, Merdinar, Schafei, Hanifa, Maleki, and Hanbali; of whom the Beiasites and the Zeidites appear to be the most liberal and tolerant, towards those who differ from them: for the Mussulmans in general do not persecute those of other religions. The Arabians have no hatred against those of a different religion. They, however, regard them with much the same contempt with which Christians look upon the Jews in Europe. Among the Arabs this contempt is regulated. It falls heaviest upon the Banians; next upon the Jews; and, least of all, upon the Christians, who, in return, express the least aversion for the Mussulmans. A Mahometan, who marries a Christian or Jewish woman, does not oblige her to apostatize from her religion; but the same man would not marry a Banian female, because this Indian sect are supposed to be strangers to the knowledge of God, having no book of divine authority. This progress towards general toleration preserves the Arabs from the rage of making proselytes.

(21.) ARABIANS, TRADE OF THE. Before the Portuguese interrupted the navigation of the Red Sea, the Arabs were the factors of all the trade that passed through that channel. Aden, which is situated at the most southern extremity of Arabia upon the Indian ocean, was the mart in these parts. The situation of its harbour, which opened an easy communication with Egypt, Ethiopia, India, and Persia, had rendered it, for many ages, one of the most flourishing factories in Asia. Fifteen years after it had repulsed the great Albuquerque, who attempted to demolish it in 1513, it submitted to the Turks, who did not long remain masters of it. The king of Yemen, who possessed the only district in Arabia that merits the title of *Happy*, drove them from thence, and removed the trade to Mocha, a place in his dominions which till then was only a village. This trade was at first inconsiderable; consisting in myrrh, incense, aloes, balm of Mecca, some aromatics, and medicinal drugs. These articles, the exportation of which is continually retarded by exorbitant imposts, and does not exceed at present 30,625*l*. were at that time more in repute than they have been since: but must have been always of little consequence. Soon after a great change ensued from the introduction of coffee. Though this article is generally used in the Arabian entertainments, none but the rich citizens have the pleasure of tasting the berry itself. The generality are obliged to content themselves with the shell and the husk of this valuable production. These remains, so much despised, make a liquor of a pretty clear colour, which has a taste of coffee without its bitterness and strength. These articles may be had at a low price at Betelsagui, which is the general market for them. Here likewise is sold the coffee which comes out of the country by

land. The rest is carried to Mocha, which is leagues distant, or to the nearer ports of Lohia and Hodeida, from whence it is transported in small vessels to Jodda. The Egyptians fetch it from the last mentioned place, and all other nations from the former. The quantity of coffee exported may be estimated at 12,550,000 weight. The European companies take off a million and a half; the Persians three millions and a half; the fleet from Suez six millions and a half; Indostan, the Maldives, and the Arabian colonies on the coast of Africa, 50,000; and the caravans a million. The coffee which is bought up by the caravans and the Europeans is the best that can be procured; it costs about 8½*d*. a pound. The Persians, who content themselves with that of an inferior quality, pay about 6½*d*. a pound. The Egyptians purchase it at the rate of about 8*d*; their cargoes being composed partly of good and partly of bad coffee. If we estimate coffee at about 10*d*. a pound, the profits accruing to Arabia from an annual exportation will amount to 384,243*l*. 15*s*. This money does not go into their coffers; but enables them to purchase the commodities brought from the foreign markets to their ports of Jodda and Mocha. Mocha receives from Abyssinia, the elephants teeth, musk, and slaves. It is supplied from the eastern coast of Africa, with gold, silver, amber, and ivory; from the Persian gulf, with dates, tobacco, and corn; from Surat, with a quantity of coarse, and a few fine linens; from Bombay and Pondicherry, with iron, lead, and copper, which are carried thither from Europe; from Malabar, with rice, ginger, pepper, India saffron, coire, cardamom, and planks; from the Maldives, with gum, benzoin, aloes-wood, and pepper, which these islands take in exchange from Coromandel, with 400 or 500 bales of cotton, chiefly blue. The greatest part of the commodities, which may fetch 262,500*l*. are consumed in the interior part of the country. The rest, particularly the cottons, are disposed of at Abyssinia, Socotora, and the eastern coast of Africa. None of the branches of business managed at Mocha, or throughout all the country of Yemen, or even at Sanaa the capital, are in the hands of the natives. The extortions with which they are perpetually threatened by the government deter them from interfering in them. All the warehouses are occupied by the Banians of Surat and Guzaret, who return to their own country as soon as they have made their fortunes. The government of Jodda is of a mixed kind: the grand Senior and the Xeriff of Mecca share the authority, and the revenue of the customs between them. These imposts are levied upon the Europeans at the rate of 8 per cent. and upon other nations 13. They are always paid in merchandise, which the managers oblige the merchants of the country to buy at a very dear rate. The Turks, who have been driven from Aden, Mocha, and every part of the Yaman, would long ago have been expelled from Jodda, if there had not been room to apprehend that they might revenge themselves in some manner as to put an end to their pilgrimages and commerce. The coined money current at Mocha, the principal port in the Red Sea, is dollars of several kinds; but they abate 5 per cent. on the price of Jodda.

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ral figures 234, 235, were upon it. The common opinion is, that Planudes, who lived towards the close of the 13th century, was the first Christian who made use of them. Father Mabillon even assures us, in his work *de Re Diplomatica*, that he has not found them any where earlier than the 14th century. Yet Dr Wallis insists of their being of a much older standing; and concludes they must have been used in England, at least as long ago as the time of Hermannus Contractus, who lived about the year 1050, if not in ordinary affairs, yet at least in mathematical ones, and particularly in the astronomical tables. The same author gives us an instance of their antiquity in England, from a mantle-tree of a chimney, in the parsonage house of Helmdon in Northamptonshire, wherein is the following inscription in *basso relievo*. N° 133, being the date of the year 1133. Mr Luffkin furnishes a yet earlier instance of their use, in the window of a house, part of which is a Roman wall, near the market place in Colchester; where between two carved lions, stands an escutcheon, containing the figures 1090. *Philos. Trans.* N° 154, 255. Mr Huet is even of opinion, that these characters were not borrowed from the Arabs, but from the Greeks; and that they were originally no other than the Greek letters, which that people made use of to express their numbers.

ARABIC GUM. See GUM, ARABIC.

ARABIC TONGUE, a branch or dialect of the Hebrew. F. Angelo de St Joseph speaks much of the beauty and copiousness of the Arabic. He assures us it has no less than 1000 names for a sword; 500 for a lion; 200 for a serpent; and 80 for honey! Such a superfluity of words seems to be rather a fault than a beauty. See ARABIANS, § 11.

ARABIC VERSIONS. See BIBLES.

ARABIC YEAR. See YEAR.

ARABICI, a sect who sprung up in Arabia, about A. D. 207, whose distinguishing tenet was, that the soul died with the body, and also rose again with it. Eusebius relates, that a council was called to stop the progress of this rising sect; and that Origen assisted at it; and convinced them so thoroughly of their error that they abjured it.

ARABICUS COSTUS. See COSTUS.

ARABICUS SINUS, the Red Sea.

ARABIS, BASTARD TOWER-MUSTARD: A genus of the siliquosa order, belonging to the tetradynamia class of plants; and in the natural method ranking under the 39th order, *Siliquosæ*. The generic mark consists in 4 nectiferous glands which lie on the inside of each leaf of the calyx. There are 8 species; but none of them remarkable for their beauty or their properties. Only one of these, viz.

ARABIS THALIANA, or the mouse-ear, is a native of Britain. It is a low plant, seldom rising more than 4 or 5 inches high, branching on every side, having small white flowers growing alternately, which have each four petals in form of a cross, that are succeeded by long slender pods filled with small round seeds. It grows naturally on sandy ground or old walls. Sheep are not fond of it, and swine refuse it.

ARABISM, or an idiom or manner of speak-

RABISMUS, § ing peculiar to the Arabs or Arabic language.

ARABIST, a person curious of, and skilled in the learning and languages of the Arabians: such were Erpenius and Golius. The surgeons of the 13th century are called Arabists by Severinus.

* ARABLE. *adj.* [from *aro*, Lat. to plow.] Fit for the plough; fit for tillage; productive of corn. His eyes he open'd, and beheld a field,
Part *arable*, and tilth; whereon were sheaves
New reap'd.

'Tis good for *arable*, a glebe that asks
Tough teams of oxen, and laborious tasks. *Dr.*
Having but very little *arable* land, they are forced to fetch all their corn from foreign countries. *Arab.*

ARABLE LAND, anciently called ARALIA, [from *arare*, to plow,] for tillage, or ploughing; of which has been ploughed up.

ARABO, or RAAB, one of the principal rivers in Hungary, which rises in the Marquissate of Soria, and discharges its waters into the Danube.

ARABS, or ARABIANS, the natives of Arabia. See ARABIA, § 5, and ARABIANS, § 1—22.

ARABS, WANDERING. See BEDOUINS.

ARABUM LEPRO, the leprosy.

ARABUM SANDARACHA. See SANDARACHA.

ARAC. See ARACK.

ARACAN, or RECCAN, the capital of a small kingdom, N. E. of the bay of Bengal. It has the conveniency of a spacious river, and a harbor large enough to hold all the ships in Europe. It is said by Schouten to be as large as Amsterdam, but the houses are slight, being made with palm trees and bamboo canes, and covered with leaves of trees. They are seldom above six feet high, but have many windows or air holes. But the people of the highest rank are much better accommodated. They have no kitchens, chimneys, cellars, which obliges the women to dress the victuals out of doors. Some of the streets are on the ridges of rocks, wherein are a great many shops. Their orchards and gardens contain all the fruit common to the Indies, and their trees are green all the year. Their common drink is toddy, which is the sap of the cocoa tree, and when new will intoxicate like wine, but soon grows sour. Elephants and buffaloes are very numerous here, and are made use of instead of horses. They have plenty of provisions, but little trade: for when Mr Channoch was here in 1686, with six large ships, there was nothing to be had in the way of commerce; and yet the country produces lac-tin, stick-lac, and elephants teeth. The Mogul subjects come here to purchase these commodities, and sometimes meet with diamonds, rubies, and other precious stones. They were formerly governed by a king of their own, called the king of the *White Elephant*; but this country has been conquered by the king of Pegu. They pay little or no regard to the chastity of their women, so that the common sailors take great liberties among them. Their religion is Paganism; and they have many temples, and priests are very numerous. The dress of the superior class is very slight, for it consists chiefly of a piece of white cotton over the arms, breast, and belly, with an apron below. The complexion of the women is tolerable; they wear thin flowered gauze over their breast and shoulders, and a piece of cotton, which they run three or four times round their waist, and let

a parcel of earthen pots, with bellies and necks like our ordinary bird bottles; he makes fast a number of these to his girdle, and any way else that he commodiously can about him. Thus equipped, he climbs up the trunk of a cocoa tree; and when he comes to the boughs, he takes out his knife, and cutting off one of the small knots or buttons, he applies the mouth of the bottle to the wound, fastening it to the bough with a bandage; in the same manner he cuts off other buttons, and fastens on his pots, till the whole number is used: this done in the evening, and descending from the tree, he leaves them till the next morning; when he takes off the bottles, which are mostly filled, and empties the juice into the proper receptacle. This is repeated every night, till a sufficient quantity is produced; and the whole being then put together, is left to ferment, which it soon does. When the fermentation is over, and the liquor or wash is become a little tart, it is put into the still, and a fire being made, the still is suffered to work as long as that which comes over has any considerable taste of spirit. The liquor thus procured is the low wine of arack; and this is so poor a liquor, that it will soon corrupt and spoil, if not distilled again, to separate some of its phlegm; they therefore immediately after pour back this low wine into the still, and rectify it to that very weak kind of proof-spirit, in which state we find it. The arack we meet with, notwithstanding its being a proof test, according to the way of judging by the crown of bubbles, holds but a sixth, and sometimes but an eighth, part of alcohol pure spirit; whereas our other spirits, when they show that proof, are generally esteemed to one half pure spirit. There is a paper of observations on arack, in the *Melanges d'Histoire Naturelle* tome v. p. 302. By fermenting, distilling, and rectifying the juice of the American maple, which has much the same taste as that of the cocoa, the author says, he made arack not in the least inferior to any that comes from the East Indies; and he thinks the juice of the sycamore and of the birch trees would equally answer the end.

(4.) ARACK, STATUTES RESPECTING. By stat. 11th Geo. I. c. 30. arack on board a ship, within the limits of any port of Great Britain, may be searched for and seized, together with the package; or if found unshipping or unshipped, before entry, may be seized by the officers of excise, in like manner as by the officers of the customs.—Upon an excise officer's suspicion of the concealment of arack, and oath made of the grounds of such suspicion before the commissioners or a justice of peace, they may empower him to enter such suspected places, and seize the liquors, with the casks, &c. If the officers are obstructed, the penalty is 100*l*. Arack is not to be sold but in warehouses, entered as directed in the 6th of Geo. I. cap. 21. upon forfeiture, and casks, &c. If permits are not returned which are granted for the removal of arack, or if the goods are not sent away within the time limited, the penalty is treble the value. If the permits are not returned, and the decrease is not found to be sufficient, the like quantity is forfeited. Permits are not to be taken out but by direction in writing of the proprietor or the stock, or his known servant, upon forfeiture

of 50*l*. or three months imprisonment. By stat. 9th, Geo. II. c. 35. if arack is offered to sale without a permit, or by any hawker, pedlar, &c. with a permit, the person to whom it is offered may seize and carry it to the next warehouse belonging to the customs or excise, and bring the person offering the same before any justice of the peace, to be committed to prison, and prosecuted for the penalties incurred by such offence. The person seizing such goods may prosecute in his own name; and on recovery is intitled to one-third part of the gross produce of the sale; and the commissioners are, if desired, upon a certificate from the justice of the offender's being committed to prison, to advance to the seizer 15*s*. per gallon for the arack seized. Arack (except for the use of seamen, two gallons each) found in any ship or vessel arrived from foreign parts, at anchor, or hovering within the limits of any port, or within two leagues of the shore; and not proceeding on her voyage (unless in case of unavoidable necessity and distress of weather, notice whereof must be given to the collector or chief officer of the port upon the ship's arrival,) is forfeited, with the boxes, casks, or other package, or the value thereof.

(II.) ARACK, TUNGUSIAN, is a spirituous liquor made by the Tartars of Tungusia, of mare's milk, left to sour, and afterwards distilled twice or thrice between two earthen pots closely stopped, whence the liquor runs through a small wooden pipe. It is more intoxicating than brandy.

ARACTHUS, a river of ancient Epirus, on which AMBRACIA was seated, now called *Spagmagmuri*.

(1.) ARACUS, in botany, wild vetch. See VICIA.

(2.) ARACUS AROMATICUS, in the materia medica, a name given by some authors to the vanilla used in making chocolate.

(1.) ARAD, a king, in the S. of Canaan. The Israelites having advanced towards the land of Canaan (Num. xxi. 1.) Arad opposed their passage, defeated them, and took a great booty from them; but they destroyed his country as soon as they became masters of Canaan.

(2.) ARAD, in ancient geography, a city of Arabia Petraea, lying S. of Judah. Eusebius places it in the neighbourhood of Kades, at the distance of 20 miles from Hebron. The Israelites, having departed from Sepher, came to Arad, and from thence to Makkelath.

(3, 4.) ARAD, in modern geography, a district and town of Hungary.

ARADOS, a word used by Hippocrates, to that perturbation which is excited in the stomach by concocting meats of different qualities. It also signifies any internal perturbation caused by purging medicines, vehement exercise, &c.

(1.) ARADUS, in ancient geography, an island between Phoenicia and Seleucia, 20 stadia from the dangerous coast. It was a rock surrounded by the sea, in compass seven stadia; and formerly a very powerful city and republic. It is now called Romad; but not a single wall is remaining of that multitude of houses which, according to Strabo, were built with more stories than even those of Rome. The liberty enjoyed by the inhabitants had rendered it very populous; and it subsisted by naval commerce, manufactures, and arts.

ARAIIS ALNIL, in botany, the name given by the people of Egypt, to the *faba Egyptia*, or heads of the nilusar.

ARAISED, raised. *Chauc.*

ARAL, a great lake in the kingdom of Khoswarazm, lying a little to the eastward of the Caspian sea. Its length from N. to S. is said to be near 150 miles, and its breadth from E. to W. about 70. Mr Walker, in his Universal Gazetteer, describes it as 300 miles long, and in some places, 150 broad; and places it 200 miles east of the Caspian sea; between 58° and 62° Long. E. and between 42° and 47° Lat. N. The shore on the W. side is high and rocky, and destitute of good water: yet there are abundance of wild horses, asses, antelopes, and wolves, and a fierce creature called a *jolbar*, which, the Tartars say, is of such a prodigious strength, as to carry off a horse. It is surprising that this lake should be quite unknown to geographers, till within these few years. Several great rivers, which were supposed to run into the Caspian sea, are now known to fall into this lake, particularly the Sihun or Sirr, and the Gihun or Amo, so often mentioned by the Oriental historians. This lake, like the Caspian sea, has no visible outlet. Its water is also very salt; and for that reason, is conveyed by the neighbouring inhabitants, by small narrow canals, into sandy pits, where the heat of the sun, by exhaling the water, leaves them a sufficient quantity of salt. The same kinds of fish are found in Aral, that are found in the Caspian sea. It is also called the **LAKE OF EAGLES**.

(I.) **ARALIA**, in ancient law writers, arable lands. They are also denominated *aratoria*, and *araturia*. In Domesday for Essex, we meet with *decem acras prati, duos runcal. quatuor aralia*; where **ARALIA** seems to denote land fit for ploughing or tillage, by way of contradistinction to *runcalla*, which was over run with briars and thorns.

(II.) **ARALIA**, in botany, the **ANGELICA TREE**: A genus of the pentagynia order, belonging to the pentandria class of plants; and in the natural method, ranking under the 46th order, Hederaceæ. The essential characters are; The involucre is an umbella; the calyx is quinque-dentated, and above the fruit; the corolla consists of five petals; and the berry has five seeds. There are five species of *aralia*, all natives of the Indies: The principal are,

1. **ARALIA NUDICAULIS**, having a stalk. This grows 3 or 4 feet high; the leaves have two large trifoliated lobes, which are sawed on their edges. The flower stalks arise between these, immediately from the root, and are terminated by round umbels of small four leaved flowers, of a whitish colour. The roots of this species were brought over from North America; and sold here for *sarsaparilla*, and it is still used as such, by the inhabitants of Cana; though it is very different from the true sort.

2. **ARALIA SPINOSA**, with a prickly stem, is a very ornamental shrub, and a native of Virginia. The height to which this tree will grow, if the soil and situation wholly agree with it, is about 12 feet: and the stem, which is of a dark brown

off; even the leaves, which are branching, composed of many wings, and of a pleasant green colour, have these defenders; which are crooked and strong, and stand as guards to them till the leaves fall off in the autumn. The flowers are produced in large umbels from the ends of the branches: They are of a greenish yellow colour; and their general characters indicate their structure. They make their appearance in the end of July or beginning of August; but are not succeeded by ripe seeds in our gardens.

(III.) **ARALIA SPINOSA**, PROPAGATION AND CULTURE OF THE. This tree will *spawn*, as the gardeners call it; i. e. after digging among the roots, young plants will arise, the broken roots sending forth fresh stems; nay, if the roots are planted in a warm border, and shaded in hot weather, they will grow; but if they are planted in pots, and assisted by a moderate warmth of dung, or tanner's bark, they will be pretty sure of success; so that the propagation of this tree is very easy. But the general method of propagating it, and by which the best plants may be had, is from seeds, which must be procured from America, for they do not ripen in Britain; and, after having obtained them, they must be managed in the following manner: The time that we generally receive them is in the spring; when we must be furnished with a sufficient number of large pots. These must be filled with fine mould, taken from a rich border. The seeds must be sown in these pots, as soon as possible after their arrival, hardly half an inch deep, and then the pots should be plunged in a warm place, their whole depth in the soil. Care must be taken to break the mould in the pots, and water them as often as it has a tendency to crust over; and if they are shaded in hot weather, the plants will frequently come up the first summer. But in any case, the pots should be plunged in a shady place; for they will flourish after that better in the shade; and the design of plunging them in a warm place at first was only with a view of setting the powers of vegetation at work, that, having natural heat, artificial shade also may be given them, and water likewise, the three grand necessities for the purpose. The pots, whether the plants are come up in them or not, should be removed into shelter in October, either into a green house, some room, or under a hotbed frame; and in the spring, when all danger of frost is over, they should be plunged into the natural ground their own depth in a shady place. Those that were already come up will have shot strong by the autumn following; and if none of them have appeared, they will come up now. Whether they are young seedlings, or small plants of a former summer's growth, they must be kept clear of weeds, and watered in the time of drought, until autumn. In October they must be again removed, either into a greenhouse, &c. as before, or fixed in a warm place, and hooped, that they may be covered with mats in frosty weather. In the end of March following, they should be planted in the nursery way, to gain strength before they are finally planted out. The ground for this purpose, besides the natural shelter, should have a reed hedge, or something of the like nature, the more effectually to prevent the piercing winds

Threads by applying these nipples to any substance, and the thread lengthens in proportion as the animal recedes from it. They can stop the issuing of the threads by contracting the nipples, and re-ascend by means of the claws on their feet, much in the same manner as some men warp up a rope. When the common house spider begins her web, she generally chooses a place where there is a cavity, such as the corner of a room, that she may have a free passage on each side, to make her escape in case of danger. Then she fixes one end of her thread to the wall, and passes on to the other side, dragging the thread along with her (or rather the thread follows her as she proceeds), till she arrives at the other side, and there fixes the other end of it. Thus she passes and repasses, till she has made as many parallel threads as she thinks necessary for her purpose. After this, she begins again and crosses these by other parallel threads, which may be named the *woof*. These are the toils or snares which she prepares for entangling flies, and other small insects, which happen to light upon it. She also generally weaves a small cell for herself, where she lies concealed watching for her prey. Betwixt this cell and the large web she has a bridge of threads, which, by communicating with the threads of the large one, both give her early intelligence when any thing touches the web, and enables her to pass quickly in order to lay hold of it. There are many other methods of weaving peculiar to different species of spiders; but as they are all intended for the same purpose, it is needless to give particular descriptions of them.

(2.) ARANEA, DISCOVERIES RESPECTING THE. The darting out of long threads, which has been observed by naturalists, and by means of which some species of spiders can convey themselves to great distances, deserves particular notice. Dr Lister tells us, that attending closely to a spider weaving a net, he observed it suddenly to desist in the mid work; and turning its tail to the wind, it darted out a thread with the violence and stream we see water spout out of a jet: this thread, taken up by the wind, was immediately carried to some fathoms long; still issuing out of the belly of the animal. By-and-by the spider leaped into the air, and the thread mounted her up swiftly. After this discovery, he made the like observation on near 30 different species of spiders; and found the air filled with young and old, sailing on their threads, and doubtless seizing gnats and other insects in their passage, there being often manifest signs of slaughter, legs and wings of flies, &c. on these threads, as well as in their webs below. Dr Hulse discovered the same thing about the same time. Dr Lister thinks there is a hint of the darting of spiders in Aristotle, (*Hist. An. lib. ix. cap. 39.*) and in Pliny, (*lib. x. cap. 74.*) But with regard to their sailing, the ancients are silent, and he thinks it was first seen by him. He also observes of those sailing spiders, that they will often dart, not a single thread only, but "a whole sheaf at once, consisting of many filaments; yet all of one length, all divided each from the other, and distinct until some chance either snap them off or entangle them. But for the most part the longer they grow, the more they spread, and ap-

pear to a diligent observer like the numerous rays in the tail of a blazing star. As for that which carries them away in the air, so swift off-hand it is partly their sudden leap; partly the length and number of the threads projected, the force of the air and wind beating more forcibly upon them; and partly the posture and management of their feet, which, at least by some sort of them I have observed to have been used very like wings or oars, the several legs (like our fingers) being sometimes close joined, at other times opened, again bent, extended, &c. according to the several necessities and will of the sailor. To fly they cannot be strictly said, they being carried into the air by external force; but they can, in case the wind suffers them, steer their course, and perhaps mount and descend at pleasure: and to the purpose of rowing themselves along the air, it is observable that they ever take their flight backwards; that is, their head looking a contrary way, like a skiff upon the Thames. It is scarce credible to what height they will mount; which yet is precisely true, and a thing easily to be observed by one that shall fix his eye some time on any part of the heavens, the white webs, at a vast distance, very distinctly appearing from the azure sky: but this is in autumn only, and that in very fair or calm weather." In a letter to Mr Ray, dated January 1670, speaking of the height spiders are able to fly to, he says "Last October, &c. I took notice, that the air was very full of webs; I sent with me to the top of the highest steeple of the Minister (in York), and could there discern them yet exceeding high above me." He further observes, that they not only thus shoot their threads upward, and mount with it in a line almost perpendicular; they also project them in a line parallel to the horizon, as may be seen by the threads running from one wall to another in a house, or from one tree to another in the field, and even from wall to wall across gardens of considerable extent. The matter of which the spider's threads are formed, is a viscid juice, elaborated in the body of the animal, and emitted from papillæ situated at the extremity of the belly, which are furnished with numerous apertures that do the business of wire-drawers, as it were, in forming the threads. Of these apertures M. Reaumur observes, there are enough in the compass of the smallest pin's head to yield a prodigious quantity of distinct threads. The holes are perceived by their effects: take a large garden spider ready to lay its eggs, and applying the finger on a part of its papillæ, as you withdraw that finger it will take with it an amazing number of different threads. M. Reaumur has often counted 70 or 80 with a microscope, but has perceived that there were infinitely more than he could tell. In effect, if he should say that each tip of a papilla furnished a thousand, he is persuaded he would say far too little. The part is divided into an infinity of little prominences, like the eyes of a butterfly, &c. Each prominence no doubt makes several threads; or rather between the several protuberances there are holes that give vent to threads; the use of the protuberances, in all probability, being to keep the threads at their first exit, before they are yet hardened by the air, &c.

ing a twelfth part of the silk of the others. Two hundred and eighty of these, he shows, would not yield more than one silk worm; 663,552 of them would scarce yield a pound.

(5.) *ARANEA*, SPECIES OF THE. The species of aranea enumerated by naturalists amount to upwards of 50; of which it may here suffice to mention a few of the most remarkable.

1. *ARANEA AQUATICA*, or the *WATER SPIDER*, is of a livid colour, with an oval belly, and a transverse line, and two hollowed points. It frequents the fresh waters of Europe. But it is in some sort amphibious: for it can live on land as well as in the water, and comes often on shore for its food; yet it swims well in water, both on its belly and back: it is distinguishable by its brightness. In the water its belly appears covered with a silver varnish, which is only a bubble of air attached to the abdomen by means of oily humours which transpire from its body, and prevent the immediate contact of the water. This bubble of air is made the substance of its dwelling, which it constructs under water: for it fixes several threads of silk, or such fine matter, to the stalks of plants in the water; and then ascending to the surface, thrusts the hinder part of its body above water, drawing it back again with such rapidity, that it attaches underneath a bubble of air, which it has the art of detaining under water, by placing it underneath the threads above mentioned, and which it binds like a covering almost all around the air bubble. Then it ascends again for another air bubble; and thus proceeds until it has constructed a large aerial apartment under water, which it enters into or quits at pleasure. The male constructs for himself one near to the female; and when love invites, he breaks through the thread walls of the female's dwelling, and the two bubbles attached to the bellies of both unite into one, forming one large nuptial chamber. The female is sometimes laid for a whole day together stretched on her back, waiting for the arrival of the male, without motion, and seemingly as if dead. As soon as he enters and glides over her, she seems to be brought to life again, gets on her legs and runs after the male, who makes his escape with all possible speed. The female takes care of the young, and constructs similar apartments on purpose for them. The figure of this spider has nothing remarkable; and would be overlooked among a crowd of curiosities, if the spectator be unacquainted with its singular art of constructing an aerial habitation under water, and thus uniting together the properties of both elements. It lodges during the winter in empty shells, which it dextrously shuts up with a web.

2. *ARANEA AVICULARIA* has a convex round breast, hollowed transversely in the middle. It is a native of America, and feeds upon small birds, insects, &c. The bite of this spider is as venomous as that of the serpent.

3. *ARANEA CALYCINA*, with a round pale yellow belly, and two hollow points. It lives in the cups of flowers, after the flower leaves have fallen off; and catches bees, and other flies, when they are in search of honey.

4. *ARANEA CUCURBITINA* has a globular yellow

low belly, with a few black spots. It lives in the leaves of trees, and incloses its eggs in a soft net.

5. *ARANEA DIADEMA* is the largest spider which this country produces. The abdomen is of an oval form, downy, and of a ruddy yellow colour, which is very variable in different seasons, being sometimes pale, at others very dark coloured. The upper part is beautifully adorned with black and white circles and dots, having a longitudinal band in the middle, composed of oblong and oval shaped pearl coloured spots, so arranged as to resemble a fillet, similar to those worn by the eastern kings. The ground upon which the fillet and the white dots are laid, when viewed with a glass, and the sun shining thereon, is beautiful and rich beyond all description. There are varieties in colour of this spider when young: some have their abdomen purple, ornamented with white dots, the legs yellow and annulated with a deeper colour: others have their abdomen of a fine red likewise ornamented with white, but the legs of a fine pale green colour; annulated with dark purple or black. It inhabits the bird tree.

6. *ARANEA FASCIATA*, with yellow band round the belly, and dusky rings on the legs, is a native of Barbary, and is as large as the thumb. It inhabits hedges and thickets: its web have large meshes, and it resides in the centre. The squares are spread for large flies, wasps, drones, and even locusts: the lesser insects can escape through the meshes. The animal which is entangled is soon bound with strong threads; killed by the spider's jaws; and partly eat, if the spider is hungry: the rest is concealed under some neighbouring dry leaves, covered with a kind of web and a blackish glue in great abundance. The larva is said to be often plentifully stored:—the nest is of the size of a pigeon's egg, divided horizontally, and suspended by the threads of the insect, which are of a silvery white, and stronger than silk. The young ones live in amity: but when grown up, are mortal enemies. They never meet but they fight with violence, and the battle only ends with the death of the weaker. The dead body is carefully stored in the larva. Twelve of these spiders, by way of experiment, were shut up together; and, after a battle of several days, the strongest only remained alive.

7. *ARANEA FIMBRIATA*, has a black oblong belly, with a white line on each side, and dusky coloured legs. It lives in water, upon the surface of which it runs with great swiftness.

8. *ARANEA HOLOSERICEA*, has an ovalish belly covered with a down, like velvet; at the base, and under part, it has two yellow spots. It is found in the folded leaves of plants.

9. *ARANEA LABYRINTHICA*, with a dusky oval belly, a whitish indented line, and a forked annulus. The web of this species is horizontal, with a cylindrical well or tube in the middle.

10. *ARANEA OCELLATA*, has three pair of eyes on its thighs. It is about the same size with the tarantula, (See N. 12 § 1.) of a pale colour, with a black ring round the belly, and two large black spots on the sides of the breast. It is a native of China.

11. *ARANEA SACCATA* has an oval belly, of a dusky iron colour. It lives in the ground, and carries a sack with its eggs, wherever it goes. This sack it glues to its belly, and will rather die than leave it behind.

12. (1.) *ARANEA TARANTULA* has the breast and belly of an ash colour; the legs are likewise ash coloured, with blackish rings on the under part; the fangs or nippers are red on the inner side, the rest being blackish: Two of its eyes are larger than the other, red, and placed in the front; four other eyes are placed in a transverse direction towards the mouth; the other two are nearer the back: It has two antennæ or feelers. It is a native of Italy, Cyprus, Barbary, and the East Indies. It lives in bare fields, where the lands are fallow, but not very hard; and from its antipathy to damp and shade, chooses for its residence the rising part of the ground facing the east. Its dwelling is about four inches deep, and half an inch wide; at the bottom it is curved, and there the insect sits in wet weather, and cuts its way out, if water gains upon it. It weaves a nest at the mouth of the hole. These spiders do not live quite a year. In July they shed their skin, and proceed to propagation; which, from a mutual distrust, as they frequently devour one another, is a work undertaken with great circumspection. (See § 3.) They lay about 730 eggs, which are hatched in the spring; but the parent does not live to see her progeny, as she expires early in the winter. The Ichneumon fly is their most formidable enemy.

(2.) *ARANEA TARANTULA*, EFFECTS OF THE BITE OF THE. The bite of the tarantula is said to occasion an inflammation in the part, which in a few hours brings on sickness, difficulty of breathing, and universal faintness. The person is afterwards affected with a delirium, and sometimes is haunted with a deep melancholy. The same symptoms return annually, in some cases, for several years; and at last terminate in death. Music, it has been pretended, is the only cure. A musician was brought, who tries a variety of airs, till at last he hits upon one that urges him to dance; the violence of which exercise produces a proportionable agitation of the vital spirits, attended with a consequent degree of perspiration, the certain consequence of which is a cure. Such are the circumstances that have been generally related, and long credited, concerning the bite of this animal. Kircherus, in his *Musurgia*, gives a very particular account of the symptoms and cure, illustrated by histories of cases. Among these, he mentions a girl, who being bitten by this insect, could be cured only by the music of a drum. He relates, that a certain Spaniard, trusting to the efficacy of music in the cure of the frenzy occasioned by the bite of the tarantula, submitted to be bitten on the hand by two of these creatures, of different colours, and possessed of different qualities. The venom was no sooner diffused about his body, than the symptoms of the disorder began to appear; upon which harpers, pipers, and other musicians, were sent for, who by various kinds of music endeavoured to rouse him from that stupor into which he was fallen: but here it was observed that the bites of the two insects had produced

contrary effects; for by one he was incited to dance, and by the other he was restrained therefrom; and in this conflict of nature the patient expired. The same account is given in his *Phosurgia Nova*, with the addition of a cut representing the insect in two positions, the patient in the action of dancing, together with the musical notes of the tune or air by which in one instance the cure was effected.

(3.) *ARANEA TARANTULA*, OPINIONS AS TO THE BITE OF THE. Kircher, in his *Musurgia*, attempting mechanically to account for the cure of the bite of the tarantula by music, says of the poison, That it is sharp, gnawing, and bilious; and that it is received and incorporated into the medullary substance of the fibres. With respect to the music, he says, That the sounds of chords have a power to rarefy the air to a certain harmonical pitch; and that the air thus rarefied, penetrating the pores of the patient's body, affects the muscles, arteries, and minute fibres, and incites him to dance; which exercise begets a perspiration, in which the poison evaporates. Unsatisfactory as this theory appears, the belief of this strange phenomenon has prevailed among the ablest of modern physicians. Sir Thomas Brown, so far from disputing it, says, That since many attest the fact from experience, and that the learned Kircherus hath positively averred it, and set down the songs and tunes solemnly used for the disease, and since some also affirm that the tarantula itself will dance at the sound of music, he shall not at all question it. *Vulg. Err. B. iii. C. 28.* Farther, that eminent Italian physician of the last century, Baglivi, a native of Apulia, the country where the tarantula is produced, has written a dissertation *De anatomia, morfu, et effectibus tarantule*. In this he describes the region of Apulia where the tarantula is produced, with the anatomy and figure of the insect and its eggs, illustrated by an engraving; he mentions particularly the symptoms that follow from the bite, and the cure of the disease by music, with a variety of histories of cures thus wrought, many of them communicated by persons who were eye witnesses of the process. Ludovicus Valetta, a Celestine monk of Apulia, published at Naples, in the year 1706, a treatise upon this spider, in which he not only answers the objections of those who deny the whole, but gives, from his own knowledge, several instances of persons who had suffered this way, some of whom were of great families, and so far from being dissemblers, that they would rather, to avoid shame, have concealed the misfortune. The honourable Robert Boyle, in his treatise of Languid and Unheeded Motions, speaking of the bite of the tarantula, and the cure of the disease which follows it by means of music, says, "That, having himself had some doubts about the matter, he was, after strict inquiry, convinced that the relations in the main were true." Dr Mead, in his *Mechanical Account of Poisons*, has given an essay on the tarantula, containing the substance of the above relations, which he endeavours to confirm by his own reasoning.

(4.) *ARANEA TARANTULA*, OPPOSITE OPINIONS RESPECTING THE. Notwithstanding the number and weight of these authorities, and the general acquiescence

quiescence of learned and ingenious men in the opinion that the bite of the tarantula is poisonous, and that the cure of the disorder occasioned by it is effected by music, we have reason to apprehend that the whole is a mistake. In the Philosophical Transactions for 1672, p. 406. is an extract of a letter from Dr Thomas Cornelio, a Neapolitan physician, to John Doddington, Esq; his majesty's resident at Venice, communicated by the letter, in which, speaking of his intention to send to Mr Doddington some tarantulas, he says, "Mean while I shall not omit to impart to you what was related to me a few days since by a judicious and unprejudicate person; which is, that being in the country of Otranto, where those insects are in great numbers, there was a man who, thinking himself stung by a tarantula, showed in his neck a small speck, about which in a very short time there arose some pimples full of a serious humour; and that, in a few hours after, the poor man was sorely afflicted with very violent symptoms, as syncope, very great agitations, giddiness of the head, and vomiting; but that, without any inclination at all to dance, and without a desire of having any musical instruments, he miserably died within two days. The same person affirmed to me, that all those that think themselves bitten by tarantulas, (except such as for evil ends feign themselves to be so,) are for the most part young wanton girls, whom the Italian writers call *Dolce di Sale*; who, by some particular indisposition falling into this melancholy madness, persuade themselves, according to the vulgar prejudice, to have been stung by a tarantula." Dr Serao, an Italian physician, has written an ingenious book, in which he has effectually exploded this opinion as a popular error; and in the Philosophical Transactions, N^o LX. for the year 1770, p. 236. is a letter from Dominico Cirillo, M. D. professor of natural history, in the university of Naples, wherein, taking notice of Serao's book, he says, "That having had an opportunity of examining the effects of this animal in the province of Taranto, where it is found in great abundance, he finds that the surprising cure of the bite of the tarantula by music has not the least truth in it; and that it is only an invention of the people, who want to get a little money by dancing when they say the tarantism begins. He adds, "I make no doubt but sometimes the heat of the climate contributes very much to warm their imaginations, and throw them into a delirium, which may in some measure be cured by music; but several experiments have been tried with the tarantula, and neither men nor animals after the bite have had any other complaint than a very trifling inflammation upon the part, like that produced by the bite of a scorpion, which goes off by itself without any danger at all. In Sicily, where the summer is still warmer than in any part of the kingdom of Naples, the tarantula is never dangerous; and music is never employed for the cure of the pretended tarantism." Mr Swinburn, when in the country of the tarantula, was desirous of investigating minutely every particular relative to that insect; but the season was not far enough advanced, and no *tarantals* were bitten, or pretending to be bitten, by the (the) had begun to stir. He prevailed, how-

ever, upon a woman who had formerly been bitten, to act the part, and dance the tarantata before him. A great many musicians were summoned, and she performed the dance, as all present assured him, to perfection. At first she lolled stupidly on a chair, while the instruments were playing some dull music. They touched, at length, the chord supposed to vibrate to her heart; and she sprang up with a most hideous yell staggered about the room like a drunken person, holding a handkerchief in both hands, raising them alternately, and moving in very true time. As the music grew brisker, her motions quickened, and she skipped about with great vigour and variety of steps, every now and then shrieking very loud. The scene was far from pleasant; and, at his desire, an end was put to it before the woman was tired. Wherever the tarantati are to dance, he informs us, a place is prepared for them, hung round with bunches of grapes and ribbons. The patients are dressed in white, with red, green, or yellow ribbons, for those are their favourite colours; on their shoulders they cast a white scarf, let their hair fall loose about their ears, and throw their heads as far back as they can bear it. They are exact copies of the ancient priestesses of Bacchus. The orgies of that god, whose worship, under various symbols, was more widely spread over the globe than that of any other divinity, were no doubt performed with energy and enthusiasm by the lively inhabitants of this warm climate. The introduction of Christianity abolished all public exhibitions of these heathenish rites, and the women durst no longer act a frantic part in the character of Bacchantes. Unwilling to give up so darling an amusement, they devised other pretences; and possession by evil spirits may have furnished them with one. Accident may also have led them to a discovery of the tarantula; and, upon the strength of its poison, the Puglian dames still enjoy their old dance, though time has effaced the memory of its ancient name and institution: and this Mr Swinburn takes to be the origin of so strange a practice. If at any time these dancers are really and involuntarily affected, he supposes it can be nothing more than an attack upon their nerves, a species of St Vitus's dance; and he inclines the more to the idea, as there are numberless churches and places throughout these provinces dedicated to that saint. Many sensible people of the country, however, differ in opinion from Dr Serao and other authors, who have ridiculed the pretended disorder, and affirmed that the venom of this species of spider can produce no effects but such as are common to all others. The Brindisians say, that the tarantulas sent to Naples for the experiment were not of the true sort, but a much larger and more innocent one; and that the length of the journey, and want of food, had weakened their power so much as to suffer the doctor or others to put their arm into the bag where they were kept with impunity. They quote many examples of persons bitten as they slept out in the fields during the hot months, who grew languid, stupid, deprived of all courage and elasticity, till the sound of some favourite tune roused them to dance, and throw off the

the poison. These arguments, however, Mr Swinburn thinks of little weight: for they acknowledged that elderly persons were more frequently infected than young ones; and that most of them were women, and those unmarried. No person above the lowest rank in life was ever seized with this malady, nor is there an instance of its causing death. The length of the dance, and the patient's powers of bearing such excessive fatigue in the particular season, prove nothing; because every day, at that time of the year, peasants may be seen dancing with equal spirit and perseverance, though they do not pretend to be seized with the tarantism. The illness may therefore be attributed to hysterics, excessive heat, stoppage of perspiration, and other effects of sleeping out of doors in a hot summer air, which is always extremely dangerous, if not mortal, in most parts of Italy. Violent exercise may have been found to be a certain cure for this disorder, and continued by tradition, though the date and circumstances of this discovery have been long buried in oblivion; a natural passion for dancing, imitation, custom of the country, and a desire of raising contributions upon the spectators, are probably the real motives that inspire the tarantati. Before Serapio's experiments, the tarantula had been proved to be harmless, from trials made in 1693 by Clarizio, and in 1740 at Lucera by other naturalists.

13. *ARANEA VIATICA*, or wanderer, is generally of a yellow colour, more or less deep. Sometimes it is whitish, and even rather green. The abdomen is large, broad, almost square, with two bands of dark orange, which arising from the thorax, descend obliquely on the sides towards the middle. Between the bands are a few small black dots, forming a kind of triangle upon the middle of the abdomen. On the thorax are seen two longitudinal bands, somewhat green, one on each side. The two foremost pair of legs are very long, and the hinder short; which makes it walk like a crab. It is found upon plants; and is a lively, active, indefatigable hunter. Without any motion of the head, which is furnished with immoveable eyes, it perceives all the flies that buzz round about, does not scare them, but stretches over them its arms, furnished with feelers, which prove nets in which their wings entangle. It is said to sit on its eggs; which, however, it often carries about with it, wrapt up in a ball of white silk.

II.) *ARANEA*, in mineralogy, a silver ore found only in the mines of Potosi, or in the single mine there of Catamito. It owes its name to some resemblance it bears to a cobweb, being composed of threads of pure silver, which, to the sight, appear like a silver lace, when burned to separate the silk from it. It is the richest of all kinds of silver ore.

III.) *ARANEA CONCHA*, in natural history, the name of a kind of sea shell, of which there are several species: we call them in English the spider shells; they are of the family of the murex, and their peculiar character is, the having digitated lips. The several species have different numbers of fingers, from the lip of the shell, as four, five, six, seven, or eight.

(IV.) *ARANEA TUNICA*. See *ARACHNOIDES*, No 1.

* *ARANEOSUS*. *adj.* [from *aranea*, Lat. a cobweb.] Resembling a cobweb.—The curious *araneous* membrane of the eye constringeth and dilateth it, and so varieth its focus. *Derham*.

ARANEUS, in medicine, a low pulse, according to Galen. The word is used by Hippocrates, for a flaky urine, having films like cobwebs in it.

ARANEUS MARINUS, the SEA SPIDER, a name by which some have called the fish more usually known by the name of *draco marinus*, and supposed to have something venomous in the spines of its back fin.

ARANIAS, a river in Transylvania.

ARANJUEZ, a town in the province of New Castile, where the king of Spain has a palace and gardens, which are reckoned the most delightful in the world. This palace is 20 miles S. of Madrid, by a pleasant road, planted on each side with trees, which cost L. 120,000 Sterling. It is delightfully situated at the conflux of the rivers Tagus and Jarama; which run through the gardens, and add new beauty to this charming spot, where art and nature seem to go hand in hand with the most pleasing and rural simplicity. On one side, fine avenues of stately oaks and lofty elms convey the truest ideas of magnificence, while they afford the most reviving shade; on the other, the sudden transitions to lawns and wildernesses, the cascades of water breaking through the thickets, the tuneful songs of numberless birds, sheltered in these cool recesses, the occasional appearance and passage of the monarch, attended by the grandees of his kingdom; all these objects united, and centered in one point, impress the mind of a traveller, with a thousand agreeable sensations. The general situation is in a very large plain, surrounded with large hills, of a most disagreeable aspect, but seldom appearing, being well hidden by the rows of trees, that extend across the flat in every direction. The main body of the palace is an old building, to which have been lately added, two new wings. The first part of the building was erected by Philip II. who purchased the estate, planted many of the avenues, and, in order to extend his chace, or to indulge his splenetic disposition, had all the vines that grew on the hills rooted up. By that means he drove away the inhabitants, and rendered the environs of his villa a perfect desert. The apartments are good; but contain nothing very particular, to take off from the enjoyment of so many fine objects abroad. In one of the new wings is a play house, and in the other a chapel. Part of the ceiling of the former was painted by Mengs, who was also sent to Rome, to paint a holy family for the principal altar in the chapel. There are seven fine pictures of Luca Jordano, in the apartment called El Gabinete Antiguo, and six others in that De los Mayordomos. The portraits of the grand duke and duchess of Tuscany, by Mengs, are in the king's dressing room. In the chapel, over the great altar, there is a fine picture of the Annunciation, by Titian, presented to him by Charles V. and brought from the convent of Juste, after the death of that emperor.

The porcelain cabinet, where there are several large pieces of the king's own manufactory, is also an object of curiosity to a traveller. The gardens consist of 3 grand divisions, distinguished by the names of La Huerta Valenciana, Los Delcites, and El Cortijo. In the Huerta Valenciana, agriculture and gardening are carried on in the same manner as in that fruitful province, and they plough with horses. In the Cortijo they use oxen, as in Andalusia; and in other places, they scratch up the ground with mules, as is still practised in some parts of Spain. Which ever way one looks round, a constant variety pleases the eye. In one place, the sturdy buffalo draws his heavy burden; in another, the slow camel, with his ponderous load; in a third, the swift zebra with his striped garment frisks over the plains. In the farm, every object of convenience is consulted, and in the dairy, every degree of neatness. The Dutch cow enjoys a luxuriant pasture, the brood mares greatly enliven the landscape, and the stables are filled with most excellent horses. And an immense nursery furnishes all manner of trees and plants. The fine avenue, which serves for a public walk, called Calle de Reyna, has nothing equal to it at Versailles. It is 4 miles long, quite straight from the palace gate, crossing the Tagus twice, before it loses itself in the thickets, where some spreading elms and tall poplars hang beautifully over the deep still pool. Near this road is a flower garden for the spring, laid out with great taste by Mr Wall, during his ministry. The gay variety of flowers is particularly pleasing to the eye at this season. As the weather grows hot, company that choose to walk, retire to a garden in an island of the Tagus, on the north side of the palace. This is an elegant place, cut into various walks and circular lawns, which in their primitive state, may have been very stiff and formal: but in the course of a century, Nature has obliterated the regular forms of art; the trees have swelled out beyond the line traced for them, and destroyed the enfilade, by advancing into the walks, or retiring from them. The sweet flowering shrubs, instead of being clipped and kept down, have been allowed to shoot up into trees, and hang over the statues and fountains they were originally meant to serve as humble fences to.—The jets-d'eau dash up among the trees, and add fresh verdure to the leaves. The terraces and balustrades built along the river, are now overgrown with roses, and other luxuriant bushes, hanging down into the stream, which is darkened by the large trees growing on the opposite banks. Many of the statues, groupes, and fountains, are handsome, some masterly, the works of Algardi: all are placed in charming points of view, either in open circular spots, at a distance from the trees, or else in gloomy arbours, and retired angles of the wood. The banks of this wood, called the *Ila*, are also enlivened by elegant yachts for the amusement of the royal family. The village formerly consisted of the palace, its offices, and a few miserable huts, where the ambassadors, and the attendants of the court, endeavoured to lodge themselves as well as they could, but always uncomfortably; many of the habitations were half under ground. What determined the

king to build a new town, and to embellish the environs, was an accident which happened at the nuncio's; a coach broke through the ceiling of his dining room, and fell in upon the table. The court then began to apply very considerable sums to the purpose of erecting proper dwellings, for the great number of persons that flock to the place where the sovereign resides; near 10,000 are supposed to live here two or three months in spring; the king keeps 115 sets of mules, which require a vast number of men to take care of them. Above a million Sterling has been laid out at Aranjuez since 1763; and it must be acknowledged, that wonders have been performed: several fine streets drawn in straight lines with broad pavements, a double row of trees before the houses, and a very grand road in the middle; commodious hotels for the ministers and ambassadors; great squares, markets, churches, and a theatre, have been raised from the ground; besides the accession of two new wings to the palace, and an amphitheatre for that relief of Gothic barbarity, *bull baiting*. Neatness and convenience have been more studied than show in the architecture, but altogether, the place has something truly magnificent in the coup d'œil.

ARANYAS-SZEK, } Four small towns,
ARANYOS-MAROTH, } or villages, in the
ARANYOS-MEDGYES, and } kingdom of Hun-
ARANY-VAR, } gary.

ARAPABACA, a name given by Plumier to the *SPIGELIA* of Linnæus, or worm grass.

ARAR, or ARARIS, in ancient geography, a river of Celtic Gaul, which rises out of mount Vogesus, on the confines of Lorrain, runs through the Franche Comte and Burgundy, and falls into the Rhone below Lyons. It is so incredibly slow, that the eye cannot distinguish which way it moves, (Cæsar); and therefore Pliny calls it the Sluggish River. Ammianus calls it *SANCONA*, which has since been changed to *SAONE*. It runs from N. to S. It is famous for a bridge of Cæsar, which was built by the soldiers in one day. It is navigable equally with the Rhone.

(1.) ARARAT, in ancient geography, the mountain on which Noah's ark rested, after the abatement of the waters of the universal deluge. Concerning this mountain there are various conjectures; though it is almost universally allowed to be in Armenia Major. Some are of opinion that it is one of the mountains which divide Armenia on the south from Mesopotamia and that part of Assyria inhabited by the *Curds*; from whom these mountains took the name of *Curdi* or *Cardu*, by the Greeks turned into *Gordjai*, &c. Others, that it lies towards the middle of Armenia, near the river Araxes, above 280 miles distant from the above-mentioned mountains, making it belong to mount Taurus; but the Armenians are positive that Noah's Ararat is no other than a mountain to which they now give the name of *Masis*, which lies about 12 leagues to the east of Erivon, and 4 leagues from the Aras. It is encompassed by several petty hills: on the tops of them are found many ruins, thought to have been the buildings of the first men, who were, for some time, afraid to descend into the plains. It stands by itself, in form of a sugar-loaf, in the midst of a



ARAYA, a cape of S. America, which forms the N. point of the Oronoque. It contains salt pits, from which the Dutch used to supply themselves freely till 1605, when their ships were destroyed by the Spaniards, who, in 1622, built a fort upon it.

(1.) ARBA, a city of the Anakims, afterwards called Hebron.

(2.) ARBA. See AMBRACIA.

(3.) ARBA. See ARBE. No. II.

(4.) ARBA, the father of Anak.

ARBACES, a governor of Media under Sardanapalus. Seeing him spinning among a company of his women, he stirred up his people to revolt, and dethroned Sardanapalus; who thereupon burnt himself in his palace. Arbaces being crowned, began the monarchy of the Medes, which lasted 117 years under nine kings, till Astyages was expelled by Cyrus. Arbaces reigned 22 years, and died A. M. 3206. See MEDIA.

ARBAGO, a place in Westmoreland, which produces a great quantity of iron ore.

ARBALEST, } See next article; also BAL-
ARBALET, } LISTA, and CROSS BOW.

* ARBALIST. *n. f.* [from *arcus*, a bow, and *balla*, an engine to throw stones.] A cross-bow. It is reported by William Brito, that the *arbalista*, or *arbalist*, was first shewed to the French king Richard the first, who was shortly after slain by a quarrel thereof. *Camden*.

(1.) ARBE, an ancient city, the capital of the island, (See No. II.) situated on a rising ground between two harbours, which form a peninsula; and containing about 1000 inhabitants, among whom are many noble, but few rich families.

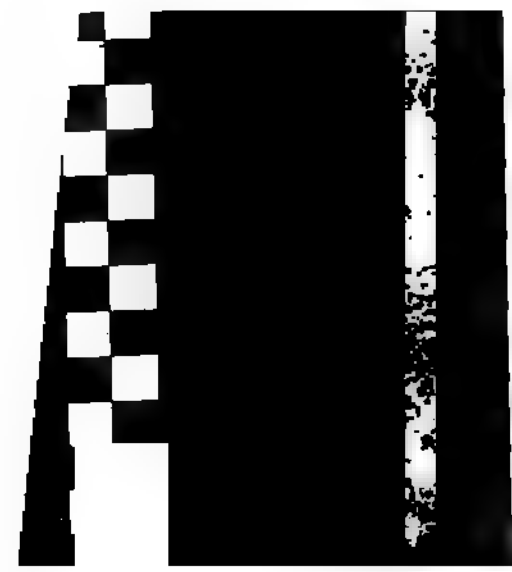
(II. 1.) ARBE, or ARBA, in ancient geography, an island of Illyria, in the gulph of Quarnaro. This island, which has been but slightly noticed by geographers, we have the following description of the Abbe Fortis.

(2.) ARBE, CLIMATE, COAST, &c. OF. The climate of Arbe is none of the happiest; the winter season is horrid, especially when agitated by the violent northerly winds, which sometimes transform the intermediate seasons into winter, and make the summer itself to disappear. These furious winds do great damage to the island, particularly in the winter and spring. Two years ago, about 12,000 sheep perished in one night, by cold, in the common pastures of the mountain; where, according to the custom over all Dalmatia, they are left in the open air the whole year round. The fog raised by the dreadful commotion of the waves, which often roars between the mountains of Arbe and the opposite Alps, in the narrow channel of Morlacca, consumes all the buds of the plants and corn, if it happens to be driven upon the island by the wind; and it is followed by a scarcity of every kind of product. This calamity communicates its baneful influence even to the flesh of the animals left on the pastures, that becomes ill-tasted, in consequence of the bitterness and bad nourishment of the food. Abstracting from these irregularities, the air of Arbe is healthy; nor ought the constant summer fevers among the inhabitants to be attributed to its influence, as they are more probably, derived from unwholesome food, and a way of life differing little

from the Hottentots. The appearance of the island is exceedingly pleasant. On the east it has a very high mountain, of the same substance as the Morlacca, of which it was once a part. At the foot of this mountain, the rest of the island is extended to the westward, and divided into beautiful and fruitful plains interspersed with little hills, fit to bear the richest products. At the extremity that looks to the north, a delightful promontory, called Loparo, stretches into the sea; it is crowned with little hills, which almost quite inclose a fine cultivated plain. Near this promontory are the two small islands of S. Gregorio and Goli, very useful to shepherds and fishers. The coast of Arbe, that faces the Morlacca mountains, is quite steep and inaccessible; and the channel between them is extremely dangerous, being exposed to furious winds, and without a single port on either side. The long and narrow island of Dolin, lying parallel to the island of Arbe, along the coast of Barbado, forms a channel less dangerous, though by no means so secure as it is beautiful to look at. There are several harbours in the neighbourhood of the city of Arbe, by which the trade of the best part of the island is facilitated.

(3.) ARBE, CURIOSITIES OF. Among the most remarkable curiosities of the island, the Arbegiani are proud of many religious reliques, and particularly of the head of S. Cristofano their protector; but the lovers of sacred antiquity will find something much more singular in the three heads of Shadrach, Meshech, and Abednego, which are venerated there with great devotion. Four of the principal gentlemen are keepers of the sanctuary, and to their care the precious records of the city are also committed. Among these records is a transaction of MXVIII, by which the city of Arbe promises to the Doge of Venice, Ottone Orseolo, a tribute of some pounds *de seta serica*, "of wrought silk," and in case of contravention, pounds *de auro obrizo*, "of pure gold." In the last age there was a learned bishop of Arbe, named Ottavio Spaderi, who would not permit the reliques of S. Cristofano to be exposed to the public veneration, on the solemnity of the saint's day, because he doubted of their authenticity. The mob rose, and was going to throw him down from the top of the hill on which the cathedral stands; nor did the tumult cease after the day was past. The government sent an armed vessel to deliver the prelate from the danger he was in; and the Pope thought proper to give him a more tractable spouse in Italy.

(4.) ARBE, HISTORY OF. In the times of the Romans, it is probable that there were no other cities in Arbe but that which bears the name of the island, in the neighbourhood of which ancient monuments are frequently dug up. Though this small island is not above 30 miles round, wholly uncultivated, and uninhabitable in the highest part that faces the channel of Morlacca, it has always maintained itself with decorum. That it was inhabited by civilized people in the time of the Romans is evident, by the inscriptions frequently discovered, and others that still remain at Arbe. In the lower times it partook of all the calamities to which all the neighbouring countries were subjected, but always recovered itself even after dissolu-



(385) A R R H
Darius, con- take reft perceiving apared for igh of the front, and extremely n, the king furrounded great officers ic and foot men. Thefe parade than oy the Great nts, carefully e right wing e Hephaf- tions, copied by the The various oft were diffic- ra, chals, and t of each divi- rather from the tion of dif- g. fufk une, whole the elephants.— tina, and Cap- are either wing- or after it began- d rear. The un- r within fight of an fortifying the as he dreaded a who often velle- manded his men a. This enufed he long and anxi- th the fatigue of a e whole army, but di, who had witnefs- to hunk of the Gra- brent Alexander di- fuffed by the fla- der of the enemy.— wo heavy-armed pha- above 16,000 men,— aimed into one line; he heavy-armed men, s, with orders, that igs of the enemy pe- nns rear of his left line, ately wheel to receive light infantry were fo t while one part refted in front, another, by left, might take them nd darters were pofted uring the belt defence e which as Alexander y become ufelefs when horfe were wounded. rears parts, Alexander e whole in an oblique ny's left, a manuvre nants to avoid contend- numbers. When his withftanding their near- nels to the enemy, ftill ftretched towards the right, Darius alfo extended his left, till fearing that by continuing this movement his men fhould be drawn gradually off the plain, he commanded the Scythian fquadrons to advance, and prevent the farther extension of the hostile line. Alexander im- mediately detached a body of horfe to oppofe them. An equeftrian combat enfued, in which both parties were reinforced; and the barbarians finally repelled. The armed chariots then affixed forth with impetuous violence, but their appearance only was formidable; for the precau- tions taken by Alexander rendered their affault harlelefs. Darius next moved his main body, but with fo little order, that the horfe, mixed with the infantry, advanced, and left a vacancy in the line, which his generals waited with vigilance to fupply. Alexander feized the decifive moment, and penetrated into the void with a wedge of fquadrons. He was followed by the neareft fec- tions of the phalanx, who rushed forward with loud shouts, as if they had already purfued the enemy. In this part of the field, the victory was not long doubtful, after a feeble refiftance, the barbarians gave way, and the pufhful Darius was foremoft in the flight. The battle, how- ever, was not yet decided. The more remote divifions of the phalanx, upon receiving intel- ligence that the left wing, commanded by Parme- nio, was in danger, had not immediately follow- ed Alexander. A vacant fpace was thus left in the Macedonian line, through which fome fqua- drons of Persian and Indian horfe penetrated with celerity, and advanced to the hoftile camp. It was then that Alexander drove fignal and well as earned advantages from his judicious order of bat- tle. The heavy armed troops and targeteers, which he had ftiffly pofted behind the phalanx, fpecifi- cally faw about, advanced with a rapid ftep, and attacked the barbarian cavalry, already entangled among the baggage. The enemy, thus fuprized, were deftroyed or put to flight. Meanwhile the danger of his left wing recalled Alexander from the purfuit of Darius. In advancing againft the enemy's right, he was met by the Parthians, In- dian, and Indian horfe, who maintained a fharp conflict. Sixty of the Companions fell: Hephaf- tion, Cernus, and Menidas, were wounded.— Having at length difpated this cloud of cavalry, Alexander prepared to attack the foot in that wing. But the battle was already effected, chiefly by the Theffalian horfe; and nothing remained to be done, but to purfue the fugitives, and to render the victory as decifive as poffible. According to the leaft extravagant accounts, with the lofs of 500 men he deftroyed 20,000 of the barbarians, who never thelefs afforded in fufficient num- bers to difpute his dominion in the Eaft. The in- valuable provinces of Babytonia, Suftania, and Per- fia, with their refpective capitals of Babyton, Sufta and Perfopolis, formed the prize of his ftill and valour. The gold and filver found in thofe cities amounted to thirty millions ftirling; the jewels and other precious fpoils, belonging to Darius, fu- ficed, according to Plutarch, to load 20,000 mules and 5000 camels." The confequences of this victory the reader will find under the article Pax- tra.



ARBELLA, a small town of Ireland, in the county of Kerry, and province of Munster, near the ruins of Ballycarthy Castle, 138 miles from Dublin.

ARBERG, or **AARBERG**, a fortified town of Switzerland, in the canton of Bern, with a handsome castle, where the bailiff resides. It is seated on the river Aar, in a kind of island, 10 m. N. W. of Bern, and 12 S. W. of Soleure. Long. 7. 5. E. Lat. 47. 0. N.

ARBES, a city of Tunis, seated in a beautiful plain, and watered by many fine springs, 2 days journey S. of Bona. It contains many relics of Roman inscriptions, &c.

(1.) **ARBIRLOT**, a parish of Scotland, on the sea coast, in the county of Forfar; 4 miles long and 3 broad. The climate is healthy, the surface hilly, and the soil so extremely various, that it often differs in the same field. In general, however, it is fertile, agriculture having been rapidly improved within these 20 years. It produces oats, barley, wheat, turnips and lint. Great attention is paid to the breeding of cattle, but there is not a single flock of sheep in the parish, notwithstanding the advantage of the hilly grounds. The rents are moderate, the roads good, and the statute labour and thirlages are commuted. The population, in 1790, by Mr Watson's report to Sir J. Sinclair, was 1055 souls. There are several mineral springs in the parish.

(2.) **ARBIRLOT**, a village in the above parish, (See N^o. 1.) seated on the Elliot; whence the original name of both, **ABERELLIOT**, the word *aber*, in Gaelic, signifying *above*. In the ancient British, it has a sense somewhat different. See **ABER**.

ARBISTOCK, a parish of N. Wales, in Denbighshire.

(1.) * **ARBITER**. *n. f.* [Lat.] 1. A judge appointed by the parties, to whose determination they voluntarily submit.—He would put himself into the king's hands, and make him *arbiter* of the peace. *Bacon*. 2. One who has the power of decision or regulation; a judge.—

Next him, high *arbiter*,

Chance governs all.

Milton.

His majesty, in this great conjuncture, seems to be generally allowed for the sole *arbiter* of the affairs of Christendom. *Temple*.

(2.) **ARBITER**, in the civil law, implies also a judge nominated by a magistrate, to decide differences, between parties. The civilians make a difference between **ARBITER** and **ARBITRATOR**, though both found their power on the compromise of the parties; the former being obliged to judge according to the customs of the law, whereas the latter is at liberty to use his own discretion, and accommodate the difference in the manner that appears to him most just and equitable.

* **ARBITRABLE**. *adj.* [from *arbitror*, Lat.] Arbitrary; depending upon the will.—The ordinary revenue of a parsonage is in land, called the glebe; in tythe, a set part of our goods rendered to God; in other offerings bestowed upon God by the people, either in such *arbitrable* proportion as their own devotion moveth them, or as the laws or customs of particular places do require them. *Spelman*.

ARBITRAGE, the decree of an arbitrator.—See **ARBITRATION**, § 1 and 2.

* **ARBITRAMENT**. *n. f.* [from *arbitror*, Lat.] Will; determination; choice. This should be written *arbitrement*.

Stand fast! to stand or fall,

Free in thine own *arbitrament* it stands,

Perfect within, no outward aid require;

And all temptations to transgress repel. *Milton*.

* **ARBITRARILY**. *adv.* [from *arbitrarius*, Lat.] With no other rule than the will; despotically; absolutely.—He governed *arbitrarily*, he was expelled; and came to the deserved end of all tyrants. *Dryden*.

* **ARBITRARINESS**. *n. f.* [from *arbitrarius*, Lat.] Despoticalness; tyranny.—He that by harshness of nature, and *arbitrariness* of commands, uses his children like servants, is what they mean by a tyrant. *Temple*.

* **ARBITRARIOUS**. *adj.* [from *arbitrarius*, Lat.] Arbitrary; depending on the will.—There are standing and irrevocable truths, such as have no precarious existence, or *arbitrarious* dependence upon any will or understanding whatsoever. *Norris*.

* **ARBITRARIOUSLY**. *adv.* [from *arbitrarius*, Lat.] Arbitrarily; according to mere will and pleasure.—Where words are imposed *arbitrarily*, distorted from their common use, the mind must be led into misprision. *Glanville*.

* **ARBITRARY**. *adj.* [from *arbitrarius*, Lat.] 1. Despotick; absolute; bound by no law; following the will without restraint. It is applied both to persons and things.

In vain the Tyrian queen resigns her life

For the chaste glory of a virtuous wife,

If lying bards may false amours rehearse,

And blast her name with *arbitrary* verse. *Wajd*.

Their regal tyrants shall with blushes hide

Their little lusts or *arbitrary* pride,

Nor bear to see their vassals ty'd *Prior*.

2. Depending on no rule; capricious.—It may be perceived, with what insecurity we ascribe effects depending on the natural period of time, unto *arbitrary* calculations, and such as vary at pleasure. *Brown's Vulgar Errors*.

ARBITRARY POWER. See **DESPOTISM**, **MONARCHY**, &c.

ARBITRARY PUNISHMENT, in law, denotes such punishments as are by statute left to the discretion of the judge. It is a general rule in arbitrary punishments, that the judge cannot inflict death. Hence all punishments that are not capital have acquired the name of *arbitrary punishments*, even although they be expressly pointed out by statute.

(1.) * **To ARBITRATE**, *v. a.* [from *arbitror*, Lat.] 1. To decide; to determine.

This might have been prevented, and made whole,

With very easy arguments of love,

Which now the manage of two kingdoms must

With fearful bloody issue *arbitrate*. *Shaksp*.

2. To judge of.—

Yet where an equal poise of hope and fear

Does *arbitrate* th' event, my nature is

That I incline to hope, rather than fear. *Miln*.

(2.) * **To ARBITRATE**, *v. n.* To give judgment.—

ment.—It did *arbitrate* upon the several reports of
 se. not like a drowsy judge, only hearing, but
 also directing their verdict. *South.*

(1.) * **ARBITRATION.** *n. f.* [from *arbitror*,
 Lat.] The determination of a cause by a judge
 mutually agreed on by the parties contending.

(2.) **ARBITRATION**, in law, is where the par-
 ties, injuring and injured, submit all matters in dis-
 pute, concerning any personal chattels or personal
 wrong, to the judgment of two or more arbiters or
 arbitrators; who are to decide the controversy:
 and if they do not agree, it is usual to add, that
 another person be called in as umpire, (*imperator* or
referee), to whose sole judgment it is then referred.
 Sometimes there are only one arbitrator originally
 appointed. This decision, in any of these cases,
 is called an *award*. And thereby the question is
 fully determined, and the right transferred or
 settled, as it could have been by the agreement of
 the parties, or judgment of a court of justice. See
Law.

* **ARBITRATOR.** *n. f.* [from *arbitrate*.] 1. An
 extraordinary judge between party and party,
 chosen by their mutual consent. *Cowel.*—

Be a good soldier, or upright trustee,

An arbitrator from corruption free. *Dryden.*

2. A governor; a president.—

Though heav'n be shut,

And heav'n's high arbitrator sit secure

In his own strength, this place may be expos'd.

Milton.

3. He that has the power of prescribing to o-
 thers without limit or controul.—Another Blean-
 kin or Ramillies will make the confederates mas-
 ters of their own terms, and arbitrators of a peace.
Action on the State of the War. 4. The deter-
 miner; he that puts an end to any affair.—

But now the arbitrator of despairs,

Just death, kind umpire of man's miseries,

With sweet enlargement doth dismiss me hence.

Shakesp.

The end crowns all;

And that old common arbitrator, time,

Will one day end it.

Shakesp.

* **ARBITREMENT.** *n. f.* [from *arbitror*, Lat.]

1. Decision; determination.—I know the knight

offended against you, even to a mortal arbitre-

ment; but nothing of the circumstance more.

Shakespeare.

We of the offending side

Must keep aloof from strict arbitrement. *Shak.*

—And was granted, and the quarrel brought to the

arbitrement of the sword. *Hayward.* 2. Compre-

romise.—Lukewarm persons think they may accom-

modate points of religion by middle ways, and

very reconcilers; as if they would make an

arbitrement between God and man. *Bacon.*

ARBLASTER, a cross-bow. *Chauc.*

ARBOGA, an ancient and neat inland town of

Sweden, in Westmania, seated on the Storae, a

lake above, where it falls into the Maerler Lake,

65 miles W. of Stockholm.

ARBOIS, a small populous town of France, in

the department of Jura, famous for its wines.

It is situated 18 miles S. E. of Dole, and 22 S. W.

of Belançon. Long. 5. 40. E. Lat. 46. 55. N.

ARBON, an ancient town of Switzerland, on

the S. banks of the lake of Constance, in Thurgau.

It has a castle built by the Romans, and is under
 the jurisdiction of the bishop of Constance. In
 time of war, the Swiss have a right to put in
 a garrison. The Popish and Protestant religions
 are equally tolerated in it. It is situated 8 miles
 N. of St Gall, and 12 S. E. of Constance. Long.
 9. 30. E. Lat. 4. 38. N.

(1.) **ARBOR**, in botany, a tree. Trees are by
 Linnæus classed in the seventh family of the veg-
 table kingdom, and are distinguished from shrubs
 in that their stems come up with buds on them;
 but this distinction holds not universally, there be-
 ing rarely any buds on the large trees in India.

(2.) **ARBOR**, in chemistry, or **ARBOR PHILOSO-**
PHICA, is a name common to several metalline
 crystallizations; thus called from their ramifica-
 tions resembling a tree. Albertus Magnus is said
 to have produced a tree, before the King of France
 while he sat at dinner. This passed at that time
 for a palingenesis, or refuscitation; but it may
 more naturally be referred to the species of ger-
 minations by crystallization.

(3.) **ARBOR**, in mechanics, the principal part of
 a machine, which serves to sustain the rest; also
 the axis or spindle on which a machine turns, as
 the arbor of a crane, windmill, &c.

* **ARBORARY.** *adj.* [*arborarius*, Lat.] Belong-
 ing to a tree. *DiB.*

ARBOR DIANÆ, or **ARBOR LUNÆ**, a kind of
 crystallization, in which *aqua fortis* incorporated
 with silver and mercury, being put in water, ex-
 pands and shoots itself into an appearance of a
 tree, with branches, leaves, and flowers. See
CHEMISTRY, INDEX.

* **ARBOREOUS.** *adj.* [*arbores*, Lat.] 1. Be-
 longing to trees; constituting a tree.—A grain of
 mustard becomes *arborescens*. *Brown.* 2. A term
 in botany, to distinguish such funguses or mosses
 as grow upon trees, from those that grow on the
 ground. *Quincy.*—They speak properly, who make
 it an *arborescens* excrescence, or rather a superplant
 bred of a viscous and superfluous lopp, which the
 tree itself cannot assimilate. *Brown's Vul. Err.*

ARBORESCENT, an epithet applied to such
 objects as resemble trees, or that grow up in the
 form of trees. See **ARBOR.**

ARBORESCENT STAR-FISH, in zoology, a species
 of asterias. See **ASTERIAS.**

* **ARBORET.** *n. f.* [*arbor*, Lat. a tree.] A small
 tree or shrub.

No arboret with painted blossoms drest,

And smelling sweet, but there it might be found,

To bud out fair, and her sweet smells throw all

around.

Fairy Queen.

Now hid, now seen,

Among thick woven arborets, and flow'rs,

Imbroider'd on each bank.

Milton.

ARBOR GENEALOGICA, tree of genealogy, or
 consanguinity, signifies a lineage drawn out under
 the resemblance of root, stock, branches, &c.

ARBOR HERMETIS, *i. e.* the tree of hermes, among
 chemists, a process of the revivification of mercury.

ARBORIBONZES, in modern history, priests
 of Japan, who live an erratic life, and subsist on
 alms. They dwell in caverns, and cover their
 heads with bonnets made of the bark of trees.

ARBORIS PECTEN. See **PECTEN.**

* **ARBORIST.** *n. f.* [*arboriste*, Fr. from *arbor*,

tree] A naturalist who makes trees his study. The nature of the mulberry, which the *arborists* observe to be long in the begetting his buds; but the cold seasons being past, he shoots them all out in a night. *Howell's Vocal Forest*.

ARBOR JUDÆ, a tree, so named by some botanists, who supposed it to be of that kind on which Judas hanged himself.

ARBOR LUNÆ. See ARBOR DIANÆ.

(1.) ARBOR MARTIS, in chemistry, is a germination of iron, resembling a natural plant. It is the invention of the younger Lemery. On a dissolution of iron filings in spirit of nitre contained in a glass, he poured oil of tartar *per deliquium*: upon this the liquor soon swelled very considerably, though with very little fermentation; and no sooner at rest than there branches adhering to the surface of the glass, which, continuing to grow, at length covered it all over. The form of the branches was so perfect, that one might even discover a kind of leaves and flowers thereon.

(2.) ARBOR MARTIS, in natural history, is applied to coral, because it grows like a tree in the sea.

* ARBOROUS. *adj.* [from *arbor*, Lat.] Belonging to a tree.

From under shady *arborous* roof
Soon as they forth were come to open sight
Of day-spring, and the sun. *Milton*.

ARBOR PHILOSOPHICA. See ARBOR, § 2.

ARBOR PORPHYRIANA, among the schoolmen, a fanciful literary figure, consisting of three columns of words; the middlemost whereof contains the series of genera and species, and bears analogy to the trunk; and the extremes, containing the differences, to the branches of a tree. Thus, e. g.

	SOCRATES,	
Greeks.	ANTONINUS, &c.	Romans.
Rational animals.	MAN.	Irrational animals.
Animate bodies.	ANIMAL.	Inanimate bodies.
Thinking substances.	BODY.	Extended substances.

SUBSTANCE.

ARBOR SCIENTIÆ, a general scheme of science.

ARBOR VINÆ. See CONVULVULUS.

ARBOR VITÆ. See THUYA.

(1.) * ARBOUR. *n. s.* [from *arbor*, Lat. a tree.] A bower; a place covered with green branches of trees.—Nay, you shall see mine orchard, where, in an *arbour*, we will eat a last year's pippen of my own grafting. *Shakespeare*.—

Let us divide our labours: thou, where choice
Leads thee, or where most needs, whether to
wind . . .

The woodbine round this *arbour*, or direct
The clasp'ing ivy where to climb. *Milton*.

For noon-day's heat are closer *arbours* made,
And for fresh evening air the open glade. *Dryden*.

(II.) ARBOUR, in gardening, a kind of shady bower, formerly in great esteem; but of late rejected on account of its being damp and unwholesome. To prevent this, arbours should have openings to admit of free ventilation, as well as of the rays of the sun. They are distinguished into *natural* and *artificial*.

1. ARBOURS, ARTIFICIAL, and cabinets, are made of lattice work, borne up by standards, cross-rails, circles, and arches of iron. For these arbours, they use small fillets of oak, which being planted, and made straight, are wrought in chequers, and fastened with wire.

2. ARBOURS, NATURAL, are formed only of the branches of trees, interwoven artfully, and borne up by a strong lattice-work, poles, hoops, &c. which make galleries, halls, porticoes, and green vistas, naturally covered. The trees where-with these arbours are formed, are usually the female elm, or lime-tree; because they easily yield, and, by their great quantity of small boughs, form a thick brush-wood; the lower parts are usually filled up with horn beams, honeysuckles, jasmines, &c.

* ARBOUR VINE. A species of bind weed; which see.

(1.) ARBROATH, a parish of Scotland in Forfarshire, comprehending little more than the town (See No 2.) and containing 4676 inhabitants, in 1792, of which only 131 belonged to the country part. There are 517 more females than males in it. The climate is dry and healthy. Many live to 70 and 80, and some above 90 years of age. Mr Gleig mentions two persons of 96 and 97, who live in 1792. The soil is various.

(2.) ARBROATH, a royal burgh of Scotland, 12 miles from Dundee, and 12 from Montrose. See ABERBROTHICK. To the description already given under that article, we shall add a few particulars from Sir J. Sinclair's Statistical Account narrated by the Rev. Mr Gleig. It is governed by a provost, 2 bailies, and 16 counsellors; and has 7 incorporated trades. Previous to 1735, it had hardly any commerce, but in Nov. 1791, its manufactures of Osnaburghs and brown linen for one year only, amounted to 1,055,303 yards, valued at L. 39,660:2:10d; and the sail cloth manufacture, in which about 500 looms are employed, produces annually about as much. Its annual imports of flax and hempsed are between 700 and 800 tons; of wood and iron about L. 4000: of lime shells about 18,000 bolls, and of coals about 7000 tons. It has a tan yard, where in hides are tanned, to the value of L. 350 yearly; and 34 vessels, which carry 1050 tons besides fishing boats. The number of its inhabitants, in 1792, was exactly 5183, but of these 638 belonged to the parish of St Vigean, to which Arbroath was formerly conjoined. In 1781, the town was threatened to be destroyed by Capt. Fall, of the Fearnought, French privateer, unless the magistrates would give L. 30,000 for its ransom. They, however, took such prudent steps, by arming the inhabitants, and procuring military aid from Montrose, that Fall at last sheared off, without doing farther damage, than knocking down a few chimney tops, although he fired red hot balls for a considerable time upon it. To prevent such insults in future, a battery has been erected, mounting 6 twelve pounders, on the Ballast Hill, which has a complete command of the Bay.

ARBURG, or AARBURG, a town of Switzerland, in the canton of Bern, on the Aar. It is small, but very strong, being seated on a rock.

and defended by a good fortress cut out of the rock. Long. 17. 55. E. Lat. 47. 10. N.

ARBURY, the name of 3 English villages; viz. 1. near Cambridge: 2. in Hertfordshire, near Ashwell: and, 3. in Warwickshire, near Nuneaton.

* ARBUSCLE. *n. f.* [*arbuscula*, Lat.] Any little shrub. *Dist.*

ARBUSCULA is used by Bradley, to denote a dwarf tree, above the rank of shrubs, but below that of trees, such, *e. g.* as the elder.

ARBUSTINE, shrubby, or like shrubs.

ARBUSTIVA, in botany, an order of plants in the *Fragmenta Methodi Naturalis* of Linnæus.

ARBUSTIVÆ, vines fastened to trees. See next article.

ARBUSTUM implies a number of trees planted for the sake of the fruit. The word was more peculiarly applied to a place planted with trees for fastening vines to, which are hence called by Columella *arbutivæ*. Arbustum is sometimes also used to denote an orchard, or field wherein trees are planted at such distance that there is room for ploughing and growing corn between.

* ARBUTE. *n. f.* [*arbutus*, Lat.] *Arbutæ*, or strawberry tree, grows common in Ireland. It is difficult to be raised from the seeds, but may be propagated by layers. It grows to a goodly tree, endures our climate, unless the weather be very severe, and makes beautiful hedges. *Mortimer's Husbandry*.

Rough *arbutæ* slips into a hazel bough
Are oft ingrafted; and good apples grow
Out of a plain tree stock. *May's Virgil*.

ARBUTHIE, a district of Scotland, in the county of Mearns.

(1.) ARBUTHNOT, Alexander, principal of the university of Aberdeen, in the reign of James VI. of Scotland, was born in 1538. He studied first at Aberdeen; and was afterwards sent over to France, where, under the famous Cujacius, he applied himself to the civil law. In 1563, he returned to Scotland, and took orders. In 1568, he was appointed minister of Arbuthnot and Logy-Buchan; and in 1569, made principal of the King's College at Aberdeen. In the general assembly which met at Edinburgh, in 1573 and 1577, he was chosen moderator; and, to the end of his life, was an active supporter of the reformed religion. He died in 1583, in the 45th year of his age; and was buried in the College Church of Aberdeen. We are told, in the *Biographia*, that he was eminent as a poet, a philosopher, a mathematician, a lawyer, a divine, and a physician. He wrote *Orationes de Origine & Dignitate Juris*, printed at Edinburgh, 1572, 4to. His contemporary Thomas Maitland wrote a copy of Latin verses on the publication of this book: they are printed in the *Delic. Poetar. Scot.* He published Buchanan's History of Scotland, in 1582.

(2.) ARBUTHNOT, a parish of Scotland, in Mearns-shire, anciently called ABERBUTHNOTH, about 6 miles in length, and 3 in breadth. The soil is various, and the climate healthy, though wet. By the exertions of Mr Barclay of Ury, agriculture is much improved, and the value of the land increased fourfold. The present population

is 1041, which is exactly one more than it was in 1774.

(3.) ARBUTHNOT, a small village in the above parish, (No 2.) which contains only 20 houses, mostly occupied by tradesmen.

(4.) ARBUTHNOT, John, M. D. was born in the parish of ARBUTHNOT, (See No 2.) and was educated and graduated at Aberdeen. He was the son of Alexander Arbuthnot, episcopal minister of that parish, who was deprived for non-conformity, in 1689. The difficulties in which his family was involved, on account of their political principles, determined him to go to London, where for some time he taught mathematics; and while he was thus employed, he published his *Examination of Dr Woodward's Account of the Deluge*. This tract, which abounded with learning and good sense, made him known. He published soon after, his *Essay on the Usefulness of Mathematics*. In the profession of physic, he advanced by slow but sure degrees; and his reputation in it, was at length fully established, by a successful cure which he performed on Prince George of Denmark. Queen Anne, in consequence of it, appointed him one of her physicians in ordinary, in 1709; and, some years before this, his extensive knowledge had procured his admission into the Royal Society. His talents and worth were his strongest recommendations to men of wit and learning; and he entered into particular connection with Pope and Swift, with whom he joined in publishing several volumes of miscellanies; among which are the well known *Memoirs of Martinus Scriblerus*, a satire of infinite humour, on the abuses of human learning. In 1715, he assisted Pope and Gay in the *Three Hours after Marriage*; a dramatic performance, which was brought upon the stage without success. In 1727, he published *Tables of ancient Coins, Weights, and Measures*; a work of great use and real erudition. In 1732, his valuable tract concerning *The Nature and Choice of Aliments* appeared; which, the year after, was followed by his remarks on *The Effects of Air on human Bodies*. A constitutional asthma had distressed him at different periods of his life, and proved fatal to him in 1734. Dr Arbuthnot appears to have been in all respects a most accomplished and amiable person. He has showed himself equal to any of his contemporaries in wit and learning, and he was superior to most men in the moral duties of life, in acts of humanity and benevolence. His letter to Mr Pope, written as it were upon his death bed, and which no one can read without emotion, discovers such a noble fortitude of mind at the approach of his dissolution, as could be inspired only by a clear conscience, and the calm retrospect of an uninterrupted course of virtue. In 1751, came out, in two vols. 8vo. printed at Glasgow, *The miscellaneous Works of the late Dr Arbuthnot*; which are said to comprehend, with what is inserted in Swift's Miscellanies, all the pieces of wit and humour, of this admirable author.

ARBUTUS, the STRAWBERRY TREE: A genus of the monogynia order, belonging to the decandria class of plants; and in the natural method ranking under the 18th order, bicornes. The ca-

Arx is divided into 5 parts; the corolla is ovated; and the fruit is a berry with 5 cells. There are 5 species: viz.

I. *ARBUTUS ACADIENSIS*, a native of Acadia.

II. *ARBUTUS ALPINA*, or MOUNTAIN STRAWBERRY TREE, a native of Britain.

III. *ARBUTUS ANDRACHNE*, or the ORIENTAL STRAWBERRY TREE; so called, because it grows plentifully in many parts of the East; where the natives use it for various purposes. It grows to a very large size. The leaves are smooth, and nearly of the same figure as the *arbutus unedo*, (See No IV.) though they are larger, and have their edges undivided. The flowers grow like the other sorts; are of the same colour; and succeeded by large, oval, scarlet fruit. The *andrachne* may be propagated in the same manner as the *unedo*: But the plants must be preserved in pots for 3 or 4 years, till they have obtained strength; and may be then planted in a warm situation, and on a dry soil, for this species will not thrive on wet ground.

IV. *ARBUTUS UNEDO*, or common strawberry tree, is a native of Italy, Spain, and Ireland; and is now very common in the British gardens. Of this species there are four varieties, viz. The oblong fruited, the round fruited, the red flowered, and the double blossomed. One description is nearly common to them all; and their inconsiderable variation is almost sufficiently shown in their respective appellations.

(1.) *ARBUTUS UNEDO*, THE DOUBLE BLOSSOMED, differs from the others, only in that the flowers are double; but this difference is so inconsiderable, that it will not be seen without looking into the flower; and even then the doubleness will appear so trifling as scarcely to merit notice; so that a plant or two, to have it said, that the collection is not without it, will be sufficient. Neither ought any more to be admitted; for they will not produce the same plenty of fruit, which constitutes the chief property of these trees, as the single sorts.

(2.) *ARBUTUS UNEDO*, THE OBLONG-FRUITED, grows to be a middle sized tree in some countries; for we read of the large uses its wood has been applied to; such as, *Arbutæ crâtes*, &c. *Arbutæan harrows*, &c. With us it may be kept down to any size. The main stems are covered with a light brown bark, rough, and falling. The younger branches are of a kind of purple colour, whilst the last year's shoots are of a fine red, and a little hairy. The leaves grow alternately on the branches, and are of an oblong oval figure. They stand on short footstalks, and the oldest leaves make a contrast with the younger by having their footstalk and mid rib of a fine scarlet colour. They are smooth, and beautifully serrated. Their upper surface (as in most trees) is of a stronger green than their under; and the young twigs are garnished with them in plenty. These are beauties in common to most trees, in some degree or other; but every thing else almost of this tree that presents itself to consideration is singular: The time of its flowering will be in November and December; when it is rather singular to see a tree in the open ground in full blow; and the fruit ripens by that time twelvemonth after.

The manner and nature of the fruit, which look like very large red strawberries, give it also a singular and delightful look; and this is heightened as they appear all over the tree among the flowers; for that is the time of its being ripe, when the flowers for the succeeding crop are full blown. The flowers themselves make no great heat; they are of a kind of whitish yellow colour; and are succeeded by the abovementioned strawberry fruit, which require a year to arrive at their maturity and colour. The flowers of the first sort are larger than those of the second; and the fruit is oval, and much larger than our common scarlet strawberry.

(3.) *ARBUTUS UNEDO*, THE RED-FLOWERED, differs in no respect from the common sort, only the flowers are red, and these constitute a variety from the other sorts of flowers; but the contrast is not so great between their fruit and them as in the other sorts, their colour approaching too near to a sameness.

(4.) *ARBUTUS UNEDO*, THE ROUND-FRUITED, has pitcher shaped flowers, which are succeeded by a round scarlet fruit, as wide as they are long; and this is all the difference between this and the oblong fruited sort.

(5.) *ARBUTUS UNEDO*, CULTURE OF THE. All the above varieties thrive best in a wet soil, and are seldom hurt by hard winters, though the young and tender branches are often destroyed by frost; but, however dead the trees may appear, they ought always to be suffered to remain till the following summer shows what are living and what are dead. The method of propagating the varieties of the *unedo* is by layers and cuttings: the species itself may be raised from seed.—1. The operation by layers must be performed on the youngest twigs; and in some soils they will sink and root pretty freely, whilst in others they can hardly be made to grow at all: But until they have lain two summers, they need scarcely be looked for. When the roots are struck, the layers should be carefully taken off in the spring, and planted in separate pots; and after well watering them, they should be plunged up to the rims in an hotbed, and this will set them forward; for without this assistance many of the layers will be lost, since they are difficult plants to make grow. After the hotbed has forced the seeds into a state of vegetation, the pots may be taken out, and plunged up to the rims in some natural mould, to keep them cool and moist; and here they may stand for two or three years, or longer, if the pots are large enough, without ever removing or sheltering in winter; for they are hardy enough to resist our severest cold. When they are to be finally set out, all the mould may be turned out of the pots hanging to the roots; and having proper holes made ready, they may be planted in them, and the plant will be ignorant of its new situation.—2. The cuttings must be planted in pots, and have the benefit of a good bark bed; in which being constantly shaded and duly watered, many of them will grow. As the plants raised this way will be rather tender by being forced in the hotbed, it will be necessary to remove them into the greenhouse, or to place them under a hotbed frame during the first winter: and after that, the pots,

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ARCADES, or ASCADIANS, the inhabitants of
 ancient ARCADIA. (See N. L.) Virgil greatly com-
 mended them for their love of, and skill in, music.
 To imitate the Arcadians, is to labour and toil for
 the benefit of others, never conquering their own,
 but the enemies of others. This probably took its
 rise from the ancient Arcadizes being accustomed
 to hire themselves out as mercenaries to foreign
 nations. Homer commends their martial pro-
 fess, their pastures, their flocks, and their well
 watered country. They boasted of their great an-
 tiquity, and that they were older than the sun
 and moon! They were the first who had a year
 of three months, and were therefore called *Proer-*
les, because their year was prior to that adjusted
 in Greece to the course of the moon.

ARCADIA, or ARCADIAN, a learned society
 at Rome. See ACADEMY, § III. N° 7.

(1.) ARCADIA, in ancient geography, an is-
 land district in the heart of Peloponnesus. It is
 mountainous, and fitter for pasture than corn;
 and therefore chiefly celebrated by pastoral poets,
 who figured Pan, the god of shepherds, to be the
 guardian of it. It was bounded on the N by
 Achæia, on the E by Argos and Laconia, by
 Messenia on the S, and Elis on the W. Accord-
 ing to Pliney, the wine of this country cured bar-
 renness in women, and inspired the men with
 rage, and the berries of the yew gathered there
 were so strong a poison, that whoever slept or
 took refreshment under that tree were sure to die.
 In Strabo's time there were few cities remaining
 in it, most of them being destroyed in the Greco-
 an wars. Enkathius says, that the country was
 anciently called *Pelagis*, from Pelagos, who
 brought the people, from roots, herbs, and leaves
 of trees, to feed on acorns, especially beech mast;
 as Artemidorus observes, that the Arcadians usu-
 ally lived on acorns. It was also called *Lycamnia*,
Gigantia, and *Parrhasia*. It is now called TAA-
 COMIA, and still abounds in corn pastures and
 woods.

(2.) ASCADIA, a sea-port of the above province,
 (N° 1.) near the gulf, and almost opposite to the
 Isle of Zante, 64 miles S. W. of Corinth, and 18
 N. of Navarin. Long. 21. 41. E. Lat. 37. 24. N.
 ARCADIAN. See ARCADES.

ARCE CUSTOS, a title anciently given to the
 arch-

archdeacon, on account of his having the custody of the church's chest, or treasure.

ARCANA. See ARCANUM, N^o I.

ARCANGIS, in the Turkish armies, an inferior kind of infantry, which serve as *enfants perdus*, and to harrafs and pillage the enemy's frontiers. The Arcangis are an order inferior to the Janisaries; and when any of them distinguish themselves, are usually preferred into the Janisaries order. They have no pay, but subsist on their plunder.

ARCANNA, a kind of red chalk, called by physiologists *rubrica fabrilis*, as being used by carpenters, to colour their lines, for marking timber, &c.

(I.) * ARCANUM. *n. f. in the plural arcana.* A Latin word signifying a secret.

(II.) ARCANUM, among physicians, any remedy, the preparation of which is industriously concealed, in order to enhance its value. There are also standing officinal compositions under this denomination; such as,

1. ARCANUM CORALLINUM, a preparation of red precipitate; made by repeatedly distilling it with the spirit of nitre, till a fine red powder be procured, which being boiled, the water poured off, and tartarized spirit of wine put to the powder; two or three cohobations are made; which leave a powder, said to be of use in the gout, dropsy, scurvy, &c. operates chiefly by stool.

2. ARCANUM DUPLICATUM, or double secret, is prepared of the *caput mortuum* of aqua fortis, by dissolving it in hot water, filtrating, and evaporating it to a cuticle; and then leaving it to shoot. It is extolled as a diuretic, and sudorific.—The recipe was purchased at the expence of 500 dollars, by that great virtuoso the duke of Holstein. Schroder, that prince's physician, writes wonders of its great uses in hypochondriacal cases, and in continued and intermitting fevers, stone, scurvy, &c. Mixed with the paste employed in binding books, it secures them effectually against all injury from that mischievous insect, the BOOK-WORM.

3. ARCANUM DUPLICATUM CATHOLICUM, a compound medicine administered by Wedelius and others, with great success, in a pestilential fever, attended with dysentery, which raged for many years in Germany, and yielded to nothing so easily as to this medicine. It was composed of bezoar, plantane root, and the root of *colchicum*.

4. ARCANUM JOVIS is made of an amalgam of mercury and tin, digested in spirit of nitre; which being drawn off, the remaining matter is wetted with spirit of wine, and the spirit burnt several times, till the pungent taste is wholly gone: what remains is used as sudorific.

5. ARCANUM TARTARI is a neutral salt soluble in water and spirit of wine, formed from the combination of vinegar with fixed alkalies.

(III.) ARCANUM, in ancient geography, a villa of Q. Cicero, the orator's brother, in Latium; now ARCE, in the Terra di Lavora, in the kingdom of Naples, on the borders of the Campagna di Roma, on the river Melpis, between Arpinum and Aquinum.

ARCAS, in the mythology, the son of Jupiter

and Callisto, who was turned into a she bear by Juno.

ARCBOUTANT, [from *arc*, and *bouter*, to push, but, Fr.] in building, an arched buttress. See BUTTRESS.

ARCE. See ARCANUM, No. III.

ARCEN-BARROIS, a town of France, in the department of Cote-d'Or, seated on the Arce, 35 miles N. of Dijon, and 13 N. W. of Langres. Long. 5. 7. E. Lat. 47. 55. N.

ARCES, a town of France, in the department of Lower Charente.

ARCESILAUS, a celebrated Greek philosopher, born at Pitane, in Eolis, about A. A. C. 350. He founded the academy, called the *second school*. He was a man of great erudition, and well versed in the writings of the ancients. He was remarkable for the severity of his criticisms; but knew how to accommodate himself to the age, and pursue the allurements of pleasure. He had a great number of disciples. His doctrines were different in several respects from those of the ancient school, and perhaps he was led into this diversity of opinions by many capital errors in the ancient school, such as the incredible arrogance of the dogmatists, who pretended to assign causes for all things; the mysterious air they had thrown upon the doctrine of ideas; the entirely discarding the testimony of the senses; the objections of the Pyrrhonists, who now began to broach their opinions; the powerful opposition of the Stoics and Peripatetics, who discovered the feeble parts of the academic philosophy. These might have given cause to reform the ancient school, and to found a new one. The middle school, therefore, laid it down as a principle, that we could know nothing, nor even assure ourselves of the certainty of this position from whence they inferred, that we should affirm nothing, but always suspend our judgment. They advanced, that a philosopher was able to dispute upon every subject, and bring conviction with him, even upon contrary sides of the same question; for there are always reasons seemingly of equal force both in the affirmative and negative of every argument. According to this doctrine, neither our senses, nor even our reason, are to have any credit: and therefore, in common affairs, we are to conform ourselves to received opinions. Arcesilaus was succeeded by his disciple Lacydes.

ARCEUIL, a village 3 miles S. of Paris, remarkable for an aqueduct, built in 1624, by M. de Medicis, which supplies Paris with water, and is thought to equal similar works of the ancient Romans. See AQUEDUCTS, § 3 and 4.

ARCEUTUM is used in some ancient law writers, for a procuration due to a bishop, abbot, or archdeacon, from their clergy, in time of entertainment.

(1.) * ARCH. *adj.* [from *αρχη*, chief.] 1. Chief of the first class.—

The tyrannous and bloody act is done;

The most *arch* deed of piteous massacre,

That ever yet this land was guilty of. *Shakspeare*

There is sprung up

An heretick, an *arch* one, Cranmer. *Shakspeare*

2. Waggish; mirthful; triflingly mischievous. The signification it seems to have gained, by being frequently used in the same sense.

quently applied to the boy most remarkable for his pranks; as, the *arch* rogue; unless it be derived from *Archy*, the name of the jester to Charles I.—Eugenio set out from the university; he had the reputation of an *arch* lad at school. *Swift*.

(2.) * *ARCH*, in composition, signifies chief, or of the first class, [from *αρχος*, or *αρχι*.] as, *arch-bishop*, *archbishop*. It is pronounced variously with regard to the *ch*, which before a consonant sound as in *cheese*, as, *archdeacon*; before a vowel like *k*, as *archangel*.

(3.) * *ARCH*. *n. f.* [*arcus*, Lat.] 1. Part of a circle, not more than the half.—The mind perceives, that an *arch* of a circle is less than the whole circle, as clearly as it does the idea of a circle. *Locke*. 2. A building open below and closed above, standing by the form of its own curve, used for bridges and other works.—

Ne'er thro' an *arch* so hurried the blown tide,
As the recomf'orted thro' the gates. *Shakefp.*

Let Rome in Tiber melt, and the wide *arch*
Of the rais'd empire fall! here is my space. *Shak.*

The royal squadron marches,
Erect triumphal *arches*. *Dryden's Albion*.

3. The sky, or vault of heaven.—

Hath nature given them eyes
To see this vaulted *arch*, and the rich cope
Of sea and land? *Shakefp.*

4. [from *αρχος*.] A chief: obsolete.—

The noble duke, my master,
My worthy *arch* and patron, comes to-night. *Shakefp.*

(4.) *ARCH*, in architecture, a concave or hollow piece of building, constructed in such a manner that the several stones of which it is composed keep one another in their places. The *arch* and *vault* properly differ only in this, that the *arch* expresses a narrower, and the *vault* broader, piece of the same kind. The principal difference in the form of arches is, that some are circular, and others elliptical; the former having a larger or smaller part of a circle, the other of an ellipse. What are called *strait arches*, are those frequently used over doors and windows, the upper and under edges of which are strait and parallel, and the ends and joints all pointing toward a centre. The space between two piers of a bridge is called an *arch*, because usually arched over. Triumphal arches are magnificent entries into cities, erected to adorn a triumph, and perpetuate the memory of the action. The arches of Titus and Constantine make at this time a great figure among the ruins of old Rome.

(5.) *ARCH*, in geometry, any part of the circumference of a circle or curved line, lying from one point to another, by which the quantity of the whole circle or line, or some other thing brought after, may be gathered.

(6.) *ARCH OF A CIRCLE* is a part of the circumference thereof, less than a half, or semicircle.

(7.) *ARCH OF DIRECTION*, in astrology, a portion of the equator, lying between two points in the heavens, one of which is the significator, and the other the promissor.

(8.) *ARCH OF PROGRESSION*, in astronomy, is an arch of the ecliptic, which a planet seems to pass over, when its motion is according to the order of the sign.

VOL. II. PART II.

(9.) *ARCH OF RETROGRADATION* is an arch of the ecliptic, described while a planet is retrograde, and moves contrary to the order of the signs.

(10.) *ARCH OF VISION* is the sun's depth below the horizon, at which a star, before hid in his rays, begins to appear again.

* *To ARCH*. *v. a.* [*arcuo*, Lat.] 1. To build arches.—

The nations of the field and wood

Build on the wave, or *arch* beneath the sand. *Pope*
2. To cover with arches.—

Gates of monarchs

Are *arch'd* so high, that giants may jet through. *Shakefp.*

—The proud river which makes her bed at her feet, is *arched* over with such a curious pile of stones, that considering the rapid course of the deep stream that roars under it, it may well take place among the wonders of the world. *Howel*. 3. To form into arches.—Fine devices of *arching* water without spilling, and making it rise in several forms of feathers and drinking glasses, be pretty things to look on, but nothing to health and sweetness. *Bacon*.

ARCHÆOGRAPHIA, the science or study of antiques, so denominated by Spon, comprehending a knowledge of ancient coins, medals, inscriptions, sculptures, statues, &c.

ARCHÆOLOGY. See *ARCHAIOLOGY*.

ARCHÆOTA. See *ANTIQUARY*, § 3.

ARCHÆUS, or *ARCHEUS*. See *ARCHEUS*.

* *ARCHAIOLOGY*, *n. f.* [from *αρχαιος*, ancient, and *λογος*, a discourse.] A discourse on antiquity.

* *ARCHAIOLOGICK*. *adj.* [from *archaiology*.] Relating to a discourse on antiquity.

(1.) * *ARCHAISM*. *n. f.* [*αρχαϊσμος*.] An ancient phrase, or mode of expression.—I shall never use *archaisms*, like Milton. *Watts*.

(2.) *ARCHAISM*, *ETYMOLOGIC*, is when either an obsolete word, declension or conjugation is used.

(3.) *ARCHAISM*, *SYNTACTIC*, is an unusual and obsolete construction in discourse.

(I. 1.) * *ARCHANGEL*. *n. f.* [*archangelus*, Lat.] One of the highest order of angels.—

His form had yet not lost

All her original brightness, nor appear'd
Less than *archangel* ruin'd, and th' excess
Of glory obscur'd. *Milton*

'Tis sure th' *archangel's* trump I hear,
Nature's great passing bell, the only call

Of God's that will be heard by all. *Norris*.

(2.) *ARCHANGEL*, according to some divines, means an angel occupying the eighth rank in the celestial hierarchy. See *ANGEL*, § 7. and *HIERARCHY*. But others, not without reason, reckon it a title only applicable to our Saviour. Compare Jude 9. with Dan. xii. 1.

(II. 1.) * *ARCHANGEL*. *n. f.* [*lamium*, Lat.] The name of a plant, called also *Dead nettle*.

(2.) *ARCHANGEL*, *BAUM-LEAVED*, in botany. See *MELITTIS*. See also *LAMIUM*.

(3.) *ARCHANGEL*, *YELLOW*. See *GALEOPSIS*.

(III. 1.) *ARCHANGEL*, in geography, a city of Russia, in the province of Dwina, situated on the E. side of the river Dwina, about 6 miles from the White Sea, 300 N. of Moscow, and 400 N. E. from Petersburg. The city extends about three miles

miles in length and one in breadth. It is rich, populous, built in the modern taste, and is a metropolitan see. Long. 39. 0. E. Lat. 64. 34. N.

(2.) **ARCHANGEL, HISTORY OF.** This city rose from a castle built on the spot by Iwan, or John Basilowitz II. to protect the increasing trade, brought there, by the discovery of the White Sea, by the English, and took its name from a monastery built in honour of the archangel Michael. Before this period the commercial intercourse between Russia and the northern parts of Europe had been long carried on by the Hanseatic towns. The ships usually sailed to Revel or Narva, and from thence passed through Dorpt to Plescof and Novogorod, where their factories were established. The accidental discovery of Archangel, in 1553, deprived the Hanseatic towns of a great part of this lucrative commerce, and transferred it to the English. On the 11th of May, that year, three ships sailed from Deptford, to explore the northern seas, under the command of Sir Hugh Willoughby. Two of these vessels penetrated as high as the 72d degree of latitude, to the coast of Spitzbergen; and being afterwards forced by stress of weather into the bay of the river Arzina in Russian Lapland, both their crews were frozen to death. Richard Chancellor, who commanded the other ship, called the *Bonaventure*, discovering the country bordering upon the White Sea, landed near the mouth of the Dwina, in a bay, which he denominated the *Bay of St Nicholas*, from a convent of that name, near the present port of Archangel. The czar, being informed of his arrival, invited him to his court, entertained him hospitably, and indulged the English with a free trade in his dominions. In consequence of this permission, a company of merchants was incorporated in London; and being encouraged by particular privileges from the czar, set on foot a considerable commerce, to the mutual advantage of both nations. This traffic the English for some time enjoyed without competition. The Dutch, however, and other nations, gradually insinuated themselves into it, and carried it on at a very great disadvantage, not being favoured with those privileges which the czar had granted to the English company. These were at last suddenly annihilated by Alexis Michaelowitz; who, in 1648, banished the English merchants from all his dominions. The cause of this expulsion was imputed to the resentment which the czar felt against the English for the execution of Charles I with whom he was closely connected by leagues of amity and alliance: but in fact he abolished the company's privileges the year before that event; and his indignation against the English for their rebellion, was only a political pretext; the real motive being derived from the offers made by the Dutch to pay duties of export and import, to the amount of 15 per cent. if they were indulged with the liberty of carrying on as free a trade as the English throughout his dominions. For not long afterwards, the czar suffered William Prideaux, Cromwell's agent, to reside at Archangel; and permitted the English to renew their commerce in that port upon the same footing with other foreigners. And upon this footing alone our merchants ever after continued to trade. The commodities chiefly imported into

Archangel, were gold and silver stuffs and laces, gold wire, cochineal, indigo, and other drugs for dyeing; wine, brandy, and other distilled spirits. The customs arising to the czar were computed at 200,000 rubles a-year, and the number of foreign ships at 400 annually. But upon the building of Petersburg, Peter the Great abolished the immunities of Archangel, and removed the commerce of the White Sea to the havens of the Baltic. Still, however, its exports of tar were considerable; in 1730, to the amount of 40,000 lasts, of 11 barrels each. In 1752 Elizabeth again restored the ancient immunities of Archangel; and its present trade is not inconsiderable. See § 3.

(3.) **ARCHANGEL, PRESENT STATE OF.** Archangel sends, during winter, great quantities of the *rawaga*, a small species of three-finned cod to Petersburg frozen. It supplies the government of Archangel, part of those of Nishnei-Novogorod and Casan, with European commodities; and draws in exchange from those parts corn, flax, hemp, coarse linen, cordage, sails, masts, and tallow, which are mostly conveyed by the Dwina: it forms also a principal communication with the northern and western parts of Siberia, from whence the merchants procure furs, skins, and iron. The houses of Archangel are generally of wood, but well contrived; and every chamber is provided with a stove, as a fence against the cold, which is here excessive in winter. The streets are paved with broken pieces of timber and rubbish, disposed so unskilfully, that one cannot walk over it without running the risk of falling, except when the streets are rendered smooth and equal by the snow that falls and freezes in the winter. Notwithstanding the severity of the cold in this place there is always plenty of good provisions; butcher's meat, poultry, wild fowl, and fish, in great variety, and sold surprisingly cheap. The most remarkable edifice in Archangel is a large town-house, built of square stones in the Italian manner and divided into three parts. One of these consists of large commodious apartments, for the accommodation of merchants, strangers as well as natives: here they are permitted to reside with their merchandise till October, when all the foreign ships set sail for the respective countries to which they belong. Then the traders are obliged to remove their quarters from the town-house to a palace, which hath a spacious court, that reaches down to the river.

ARCHANGEL-GOROD, a government or province of Russia, in Europe, comprehending part of Lapland, and the ancient kingdom of Holmogard.

* **ARCHANGELICK.** *adj.* [from *archangel*.] Belonging to archangels.—

He ceas'd, and th' *archangelick* pow'r prepar'd
For swift descent; with him the cohort bright
Of watchful cherubim. *Milnes*

ARCHARD, in commerce, a kind of green fruit, pickled in vinegar, much valued throughout the East Indies. The best are those brought from Persia, in bottles, much like small cucumbers among us.

* **ARCHIBEACON.** *n. s.* [from *arch* and *beacon*.] The chief place of prospect, or of signal.—
You shall win the top of the Cornish *archibeacon*. *Blair*

Hainborough, which may for prospect compare with Rama in Palestina. *Carew.*

(1.) * **ARCHBISHOP.** *n. f.* [from *arch* and *bishop*.] A bishop of the first class, who superintends the conduct of other bishops in his suffragans.—

Cranmer is return'd with welcome,

Install'd lord *archbishop* of Canterbury. *Shakesp.*

—The *archbishop* was the known architect of this new fabrick. *Clarendon.*

(2.) **ARCHBISHOP, ACCOUNT OF THE TITLE AND OFFICE OF.** Archbishops were not known in the east till about the year 320; and though there were some soon after this who had the title, yet that was only a personal honour, by which the bishops of considerable cities were distinguished. It was not till of late that archbishops became metropolitans, and had suffragans under them. Athanasius appears to be the first who used the title *Archbishop*, which he gave occasionally to his predecessor; Gregory Nazianzen, in like manner, gave it to Athanasius; not that either of them were intitled to any jurisdiction, or even any precedence in virtue of it. Among the Latins, Isidore Hispalensis is the first that speaks of archbishops. He distinguishes four orders or degrees in the ecclesiastical hierarchy, viz. patriarchs, archbishops, metropolitans, and bishops. The archbishop, besides the inspection of the bishops and inferior clergy in the province over which he presides, exercises episcopal jurisdiction in his own diocese. He is guardian of the spiritualities of any vacant see in his province, as the king is of the temporalities; and exercises ecclesiastical jurisdiction in it. He is intitled to present by lapse to all the ecclesiastical livings in the disposal of his diocesan bishop, if not filled within six months. He has likewise a customary prerogative, upon consecrating a bishop, to name a clerk or chaplain to be provided for by such bishop; in lieu of which it is now usual to accept an option. He is said to be *enthroned* when vested in the archbishopric; whereas bishops are said to be *installed*.

(3.) **ARCHBISHOPS, PRIVILEGES OF ENGLISH.** The ecclesiastical government of England is divided into two provinces, viz. Canterbury and York. Canterbury hath the following suffragan bishoprics appertaining to it, St Asaph, Bangor, Bath and Wells, Bristol, Chichester, Litchfield and Coventry, St David's, Ely, Exeter, Gloucester, Hereford, Landaff, Lincoln, London, Norwich, Oxford, Peterborough, Rochester, Salisbury, Winchester, and Worcester. To York appertain the bishoprics of Carlisle, Chester, and Durham; to which may be added the bishopric of Sodor and Man, whose bishop is not a Lord of Parliament. See **CANTERBURY** and **YORK**. The archbishop of Canterbury had anciently, viz. till the year 1152, jurisdiction over Ireland as well as England, and was styled a *patriarch*, and sometimes *alterius orbis papa*, and *orbis Britannici pontifex*. Matters were recorded in his name thus, *anno pontificatus nostri primo*, &c. The first archbishop of Canterbury was Austin, appointed by king Ethelbert, on his conversion to Christianity, about the year 598. He was also *legatus natus*. He even enjoyed some special marks of royalty; as, to be patron of a bishopric, which he was of Rochester; and to make knights, coin moneys,

&c. He is still the first peer of England, and the next to the royal family; having precedence of all dukes and all great officers of the crown. It is his privilege, by custom, to crown the kings and queens of this kingdom. He may retain and qualify eight chaplains; whereas a duke is by statute allowed only six. He has, by common law, the power of probate of wills and testaments, and granting letters of administration. He has also a power to grant licences and dispensations in all cases formerly sued for in the court of Rome, and not repugnant to the law of God. He accordingly issues special licences to marry, to hold two livings, &c. and he exercises the right of conferring degrees. He also holds several courts of judicature; as, court of arches, court of audience, prerogative court, and court of peculiars. He is addressed with the title of *Grace, and Most Reverend Father in God*; and writes himself by *Divine Providence*; whereas bishops only use by *Divine Permission*. The archbishop of York has the like rights in his province, as the archbishop of Canterbury. He has precedence of all dukes not of the royal blood; and of all officers of state, except the lord high chancellor. He has also the rights of a count palatine over Hexamshire. The first archbishop of York was Paulinus, appointed by Pope Gregory about the year 622. He had formerly jurisdiction over all the bishops of Scotland; but in 1470, pope Sixtus IV. created the bishop of St Andrew's, archbishop and metropolitan of all Scotland.

(4.) **ARCHBISHOPS, SCOTS AND IRISH.** Scotland, whilst episcopacy prevailed in that country, had two archbishops, of St Andrew's and Glasgow; of which the former was accounted the metropolitan; and, even before it arrived at the dignity of an archbishopric, resisted with great spirit all the attempts of the archbishops of York in England to become the metropolitans of Scotland. The sees of Argyle, Galloway, and the Isles, were suffragans to Glasgow; all the others in the kingdom, to St Andrew's. Ireland has four archbishops; of Armagh, Dublin, Cashel, and Tuam; of whom the former is primate of all Ireland.

* **ARCHBISHOPRICK.** *n. f.* [from *archbishop*.] The state or jurisdiction of an archbishop.—

'Tis the cardinal;

And merely to revenge him on the emperor,
For not bestowing on him, at his asking,

The *archbishoprick* of Toledo, this is purpos'd.
Shakespeare.

—This excellent man, from the time of his promotion to the *archbishoprick*, underwent the envy and malice of men who agreed in nothing else. *Clarend.*

ARCH-BUTLER, one of the great officers of the German empire, who presents the first cup to the emperor on solemn occasions. This office belongs to the king of Bohemia. The prince of Limbourg is his vicar.

ARCH-CHAMBERLAIN, an officer of the empire; the same with the great chamberlain in England. The elector of Brandenburg was appointed arch-chamberlain of the empire, by the golden bull; and he bears the sceptre before the emperor, walking on the left hand of the elector of Saxony. At some solemnities he also serves on horseback

al prize, which for the first time was shot for upon the 28th of July 1788 by a numerous and respectable meeting. The Woodmen of Arden and the Toxophilite have lately been pleased to admit the members of the Royal Company to the freedom of their societies: these grants have been followed by reciprocal diplomas from the Royal Company; so that the three chief societies of archers in Britain may be said to be now incorporated into one. The prizes belonging to this Company, and which are annually shot for, are, 1. A silver arrow, given by the town of Musselburgh, which appears to have been shot for as early as the year 1603. The victor in this, as in the other prizes, except the king's prize, has the custody of it for a year, then returns it with a medal appended, on which are engraved any motto and device which the gainer's fancy dictates. 2. A silver arrow given by the town of Peebles A. D. 1626. 3. A silver arrow given by the city of Edinburgh A. D. 1709. 4. A silver punch-bowl of about the value of L. 50, made of Scottish silver at the expence of the Company A. D. 1720. And, 5. The king's prize abovementioned, which becomes the absolute property of the winner. All these prizes are shot for at what is termed *rovers*, the marks being placed at the distance of 185 yards. Besides these, there is another prize annually contended for at butt or point blank distance, called the *Goose*. The ancient manner of shooting for this prize was, a living goose was built in a turf butt, having the head only exposed to view; and the archer who first hit the goose's head was entitled to the goose as his reward. But this custom, on account of its barbarity, has been long ago laid aside; and in place of the goose head, a mark of about an inch diameter is affixed upon each butt, and the archer who first hits this mark is captain of the butt shooters for a year. The affairs of the Company are managed by a preses and six counsellors, who are chosen annually by the whole members. The council are vested with the power of receiving or rejecting candidates for admission, and of appointing the company's officers civil and military. The Company now consists of above 1000 members, among whom are most of the Scottish nobility of the first distinction. A number of the Company meet weekly during the summer season in Edinburgh, in the Meadows, where they exercise themselves in shooting at butts: And in the adjoining ground they have a handsome building, erected within these 12 years, with suitable offices, whither they adjourn after their exercise, and where they hold their elections and other meetings relative to the business of the society. Their uniform is tartan, lined with white, and trimmed with green and white fringes; a white sash, with green tassels; and a blue bonnet, with a St Andrew's cross and feathers. The Company have two standards. The first of these bears on one side Mars and Cupid encircled in a wreath of thistles; with this motto, "In peace and war." On the other, a yew tree, with two men dressed and equipped as archers, encircled as the former; motto, *Dat gloria vires*. The other standard displays, on one side, a lion rampant gules, on a field, or, encircled with a wreath; on the top, a thistle and

crown; motto, *Nemo me impune lacessit*. On the other, St Andrew on the cross on a field argent at the top, a crown; motto, *Dulce pro patria rriculum*.

(1.) * ARCHERY. *n. f.* [from *archer*.] 1. The use of the bow.—Among the English artillery, *archery* challengeth the pre-eminence, as peculiar to our nation. *Camden*. 2. The act of shooting with the bow.—

Flower of this purple dye,
Hit with Cupid's *archery*,
Sink in apple of his eye!

Shakesp. Midf. Night's Dream

3. The art of an archer.—

Blest seraphims shall leave their quire,
And turn love's soldiers upon thee,
To exercise their *archery*.

Craslow's Steps to Temperance

Say from what golden quivers of the sky
Do all thy winged arrows fly?
Swiftness and power by birth are thine.
'Tis I believe this *archery* to shew,
That so much cost in colours thou,
And skill in painting, dost bestow
Upon thy ancient arms the gaudy heavenly dye.

Lowell

(2.) ARCHERY, FARTHER DEFINITION OF. *Archery* is rather more accurately defined the art or exercise of shooting with a bow and arrow. Johnson, in his definition both of *ARCHER*, (N^o 1.) and *ARCHERY*, (N^o 1.) seems to have forgot the *arrow* was necessary to shoot with.

(3.) ARCHERY, HISTORY OF. In most nations the bow was anciently the principal implement of war, and by the expertness of the archers it was often decided the fate of battles and of empires.—In this island archery was greatly encouraged in former times, and many statutes were made for the regulation thereof; whence the English archers became the best in Europe, and obtained many signal victories. The *Artillery Company* of London, though they have long discontinued the weapon, are the remains of the ancient bowmen or archers. *Artillery* (*artillerie*) is a French term signifying *archery*; as the king's bowmen in that language styled *artillier du roy*: And from that nation the English seem to have learnt at least the cross bow archery. William the Conqueror had a considerable number of bowmen in his army at the battle of Hastings, when no mention is made of such troops on the side of Harold: And it is supposed that these Norman archers shot with the *arbalist* (or cross bow,) in which formerly the arrow was placed in a groove, termed in French *quadrel*, and in English a *bolt*. Of the time when shooting with the long bow first began among the English, there appear no certain accounts. The chroniclers do not mention the use of archery till the death of Richard I. who in 1199, was killed by an arrow at the siege of Limoges in Guienne, which Hemmingford mentions to have issued from a cross bow.—After this, there appear no notice of archery for nearly 150 years, when an order was issued by Edward III. in the 15th year of his reign, to the sherives of most of the English counties for providing 500 white bows and 500 bundles of arrows, for the then intended war against France. Similar orders are repeated in the following

following years; with this difference only, that the sheriff of Gloucestershire is directed to furnish 100 painted bows, as well as the same number of white. The famous battle of Cressy was fought years afterwards, in which our chroniclers state that we had 2000 archers, who were opposed to about the same number of French, together with a circumstance which seems to prove, that by this time we used the long bow, whilst the French archers shot with the arbalest. Previously to the engagement there fell a very heavy rain, which had to have damaged the bows of the French, perhaps rather the strings of them. Now the long bow (when unstrung) may be most conveniently covered, so as to prevent the rain from hitting it; nor is there almost any addition to the weight from such a case; whereas the arbalest is almost inconvenient form to be sheltered from a shower of weather. As therefore, in 1342, orders were sent to the sherives of each county to provide 500 bows, with a proper proportion of arrows, it seems probable that these were long bows, and not the arbalest. At this battle, the English ascribed their victory chiefly to the archers.—The battle of Poitiers was fought A. D. 1356, and gained by the same means. Sometimes the archers gained great victories without the least assistance from the men at arms; as, particularly the decisive victory over the Scots at Homildon, A. D. 1402. In that bloody battle, the men at arms did not strike a blow, but were mere spectators of the valour and display of the archers. The Earl of Douglas, who commanded the Scotch army in that action, engaged to see his men falling thick around him by showers of arrows, and trusting to the goodness of his armour (which had been three years in making), accompanied by about eighty lords, knights, and gentlemen, in complete armour, rushed forward, and attacked the English archers sword in hand. But he soon had reason to repent his rashness. The English arrows were so sharp and numerous, and discharged with so much force, that no armour could repel them. The Earl of Douglas, after receiving five wounds, was made prisoner; and all his brave companions were either killed or taken. Philip de Comines acknowledges, that our own writers assert, that the English archers excelled those of every other nation; and Sir John Fortescue says again and again,—“that the strength of the realme of England standyth upon archers.” The superior dexterity of their archers gave the English a great advantage over their capital enemies the French and Scots. The French depended chiefly on their men at arms, and the Scots on their pikemen; but the ranks of both were often thrown and thrown into disorder by flights of arrows before they could reach their enemies. James I. of Scotland, who had seen and admired the dexterity of the English archers, and who was himself an excellent archer, endeavoured to revive the exercise of archery, among his own subjects, in whom it had been too much neglected. With this view, he ridiculed their awkward manner of handling their bows, in his humorous poem of *Christ's Kirk on the Green*; and procured the following law to be made in his first parliament, A. D. 1424, immediately after his return to Scotland: “That all men might bask thame to be ar-

chares, fra the be 12 years of age; and that at ilk ten punds worth of land, thair be made bow markes, and speciallie near parochie kirks, quhairn upon halie dayis men may cum, and at the leist schute thryse about, and have usage of archerie: and wha so usis not archerie, the laird of the land shall rais of him a wedder; and giff the laird raisis not the said pane, the king's shiref or his ministers shall rais it to the king.” But the untimely death of that excellent prince prevented the effectual execution of this law. In 1417, Henry V. ascribes his victory at Agincourt to the archers, and directs the sherives of many counties to pluck from every goose six wing feathers, for the purpose of improving arrows, which are to be paid for by the king. In 1421, though the French had been defeated, both at Cressy, Poitiers, and Agincourt, by the English archers, yet they still continued the use of the cross bow; for which reason, Henry V. as duke of Normandy, confirmed the charters of the balistarii, which had been long established as a fraternity in Rouen. In the 5th of Edward IV. an act passed, that every Englishman, and Irishman dwelling with Englishmen, shall have an English bow of his own height, which is directed to be made of yew, wych, hazel, ash, or auburne, or any other reasonable tree according to their power. The next chapter also directs, that butts shall be made in every township, which the inhabitants are obliged to shoot up and down every feast day, under the penalty of a *halfpenny* when they should omit this exercise. In the 14th year of this king, it appears by Rymer's *Fœdera*, that 1000 archers were to be sent to the duke of Burgundy, whose pay is settled at sixpence a day, which is more than a common soldier receives clear in the present times, when provisions are so much dearer, and the value of money so much decreased. This circumstance proves very strongly, the great estimation in which archers were still held. In the same year, Edward preparing for a war with France, directs the sherives to procure bows and arrows, “as most specially requisite and necessary.” On the war taking place with Scotland, 8 years after this, Edward provided both ordnance and archers; so that though the use of artillery (as we now term it) was then gaining ground, yet that of the bow and arrow was not neglected. Richard III. by his attention to archery, was able to send 1000 bowmen to the duke of Bretagne, and he availed himself of the same troops at the battle of Bosworth. During the time of Henry VII. there appears no order relative to gunpowder or artillery; but in 1488, he directed a large levy of archers to be sent to Brittany, and that they shall be reviewed before they embark. In the 19th year of his reign, this king forbid the use of the cross bow, because “the long bow had been much used in this realm, whereby honour and victory had been gotten against outward enemies, and the realm greatly defended,” &c. In the reign of Henry VIII. several statutes were made for the promotion of archery. The 8th Eliz. c. 10. regulates the price of bows, and the 13th Eliz. c. 14. enacts, that bow staves shall be brought into the realm from the Hanse towns and the Eastward; so that archery still continued to be

be an object of attention. In Rymer's *Fœdera* there is neither statute nor proclamation of James I. on this head; but it appears by Dr Birch's Life of his son (prince Henry,) that at 8 years of age he learned to shoot both with the bow and gun, whilst at the same time, this prince had in his establishment, an officer, who was styled *bow bearer*. The king granted a second charter to the artillery company, by which the powers they had received from Henry VIII. were considerably extended. Charles I. appears, from the dedication of a treatise intitled *The Bowman's Glory*, to have been himself an archer; and in the 8th year of his reign, he issued a commission to the chancellor, lord mayor, and several of the privy council, to prevent the fields near London being so inclosed as "to interrupt the necessary and profitable exercise of shooting," as also to lower the mounds where they prevented the view from one mark to another. Catharine of Portugal (queen to Charles II.) seems to have been much pleased with the sight, at least, of this exercise; for in 1676, by the contributions of Sir Edward Hungerford and others, a silver badge for the marshal of the fraternity was made, weighing 25 ounces, and representing an archer drawing the long bow (in the proper manner) to his ear, with the following inscription: *Reginæ Catharinæ Sagittarii*. The supporters are two bowmen, with the arms of England and Portugal. In 1682, there was a most magnificent cavalcade and entertainment, given by the Finsbury archers, when they bestowed the titles of "duke of Shoreditch," "marquis of Islington," &c. upon the most deserving. Charles II. was present, but the day being rainy, he was obliged soon to leave the field. So lately as 1753, targets were erected in the Finsbury fields, during the Easter and Whitsun holidays; when the best shooter was styled captain for the ensuing year, and the second lieutenant. Though archery continued to be encouraged by the king and legislature, for more than two centuries after the first knowledge of the effects of gunpowder, yet by the end of the reign of Henry VIII. it seems to have been partly considered as a pastime. Arthur, the elder brother of Henry, is said to have been fond of this exercise, in so much that a good shooter was styled *Prince Arthur*. We are also informed, that he pitched his tent at Mile End, to be present at this recreation, and that Henry his brother attended. When the latter became king, he gave a prize at Windsor, to those who should excel in this exercise; and a capital shot having been made, Henry said to Barlow, (one of his guards,) "If you still win, you shall be duke over all archers." Barlow therefore having succeeded, and living in Shoreditch, was created duke thereof. Upon another occasion, Henry and the queen were met by 200 archers on Shooter's Hill, which probably took its name from their assembling near it to shoot at marks. This king likewise gave the first charter to the artillery company, in the 29th year of his reign, by which they are permitted to wear dresses of any colour except purple and scarlet, to shoot not only at marks but birds, if not pheasants or herons, and within two miles of the royal palaces. They are also enjoined by the same charter, not to wear

furs of a greater price than those of the martin. The most material privilege, however, is, that of indemnification from murder, if any person passing between the shooter and the mark is killed, provided the archers have first called out *sagittari*. The long bow, however, maintained its place in our armies, long after the invention of fire arms. Nor have there been wanting experienced soldiers who were advocates for its continuance, and who in many cases, even preferred it to the harquebus or musket. King Charles I. twice granted special commissions under the great seal, for enforcing the use of the long bow. The first was in the 4th year of his reign: but this was revoked by proclamation, four years afterwards, on account of divers extortions and abuses committed under sanction thereof. The second, anno 1633, in the 9th year of his reign, to William Neade and his son, also named William, wherein the former is styled an ancient archer, who had presented to the king, a warlike invention, for uniting the use of the pike and bow, seen and approved by him and his council of war; wherefore his Majesty had granted them a commission to teach and exercise his loving subjects in the said invention, which he particularly recommended the chief officers of his trained bands, to learn and practise; and the justices and other chief magistrates throughout England, are therein enjoined to use every means in their power to assist Neade, his son, and all persons authorised by them in the furtherance, propagation, and practice of this useful invention. Both the commissions and proclamation are printed at large in Rymer. At the breaking out of the civil war, the Earl of Essex issued a precept, dated in November 1643, for stirring up all well affected people by benevolence towards the raising a company of archers for the service of the king and parliament.

(4.) ARCHERY, MODERN ENGLISH, REASONS FOR THE SUCCESS OF. Before the introduction of fire arms, the enemy could only be struck at a distance by slings, the bow used by the ancients, or the cross bow; to all which the English long bow was vastly superior. As for slings, they never have been used in the more northern parts of Europe, by armies in the field; nor does their use indeed seem to have been at all convenient, or extensively practicable, for two principal reasons. 1. Slingers cannot advance in a compact body, on account of the space to be occupied by this weapon, in its rotatory motion. 2. The weight of the stones to be carried, must necessarily impede the slingers greatly in their movements. The bow of the ancients, again, as represented in all their reliefs, was a mere toy compared with that of our ancestors; it was therefore chiefly used by the Parthians, whose attacks (like those of the present Arabs) were desultory. The cross bow is of a most inconvenient form for carriage, even with the modern improvements; and, in case of rain, could not be easily secured from the weather.—After the first shot it could not be soon recharged; the bolts were also heavy and cumbersome. The English long bow, on the other hand, together with the quiver of arrows, was easily carried by the archer, as easily secured from rain, and recharged almost instantaneously. It is not therefore extraordinary,

ordinary, that troops, who solely used this ancient weapon, should generally obtain the victory, even when opposed to much more numerous armies. It may be urged, that these losses having been experienced by our enemies, must have induced them to practise the same mode of warfare. But it is thought that the long bow was not commonly used even in England till the time of Edward III. when the victory at Cressy sufficiently proclaimed the superiority of that weapon. It required, however, so much training before the archer could be expert, that we must not be surprised if soon afterwards this military exercise was much neglected, as appears by the preambles of several ancient statutes. Whilst the military tenures subsisted, the sovereign could only call upon his tenants during war, who therefore attended with the weapons they had been used to, and which required no previous practice. On the other hand, the English archers were obliged by acts of parliament, even in time of peace, to erect butts in every parish, and to shoot on every Sunday and holiday, after repairing perhaps to these butts from a considerable distance, whilst the expence of at least a yew bow is represented as being a charge which they were scarcely equal to. The king and parliaments of this country having thus compelled the inhabitants to such training, the English armies had the same advantage over their enemies as the exclusive use of fire arms would give us at present. It appears also that the long bow continued to be in estimation for more than two centuries after gun powder was introduced, which probably arose from muskets being very cumbersome and unwieldy. Rapid movements are generally decisive of a campaign; and in such the archers were particularly adapted, because, as they could not be annoyed at the same distance, they had scarcely any occasion for armour. The flower of ancient armies likewise was the cavalry, against which the long bow never failed to prevail, as man and horse were too large objects to be missed: and hence the great number of French nobility who were prisoners at Cressy, Poitiers, and Agincourt; for being dismounted, if not wounded, whilst they were clad in heavy armour, they could not make their escape. This accounts for the English obtaining those signal victories with inferior numbers; for the nobility and gentry thus becoming prisoners, the other parts of the French army made little or no resistance.—No wonder, therefore, that in England the greatest anxiety was shown to promote the exercise of this important weapon, and that so many statutes were made for that purpose. In Scotland, also, little less attention, though apparently not with equal success, was shown to the encouragement of the art. In both kingdoms, it was provided, that the importers of merchandise should be obliged, along with their articles of commerce, to import a certain proportion of bows, bow-staves, and shafts for arrows. Every person was enjoined to hold himself provided in bows and arrows, and was prohibited the frequent use of archery; and a restraint was imposed upon other sports, lest they should interfere with the use of the bow; for it was intended, that people should be made expert in the use of it as a military weapon, by habitual

ing them to the familiar exercise of it as an instrument of amusement. As there was no material difference between the activity and bodily strength of the two people, it might be supposed that the English and Scots wielded the bow with no unequal vigour and dexterity: but from undoubted historical monuments it appears that the former had the superiority; of which one instance has been already narrated. (See § 3.) By the regulations, prescribed in their statute-book for the practice of archery, we find that the English shot very far, those who were arrived at their full growth and maturity being prohibited from shooting at any mark that was not distant upwards of 220 yards. In use of the bow, great dexterity as well as strength seem to have been requisite. Though we hear of arrows at Cheviot Chace which were a yard long, yet it is by no means to be supposed that the whole band made use of such, or could draw them to the head. The regulation of the Irish statute of Edward IV. viz. that the bow shall not exceed the height of the man, is allowed by archers to have been well considered; and as the arrow should be half the length of the bow, this would give an arrow of a yard in length to those only who were six feet high. A strong man of this size in the present times cannot easily draw above 27 inches if the bow is of a proper strength to do execution at a considerable distance. At the same time it must be admitted, that our ancestors were obliged by some of the old statutes to begin shooting with the long bow at the age of seven, they might have acquired a greater flight in this exercise than their descendants, though the latter should be allowed to be of equal strength.

(5.) ARCHERY, MODERN METHOD OF PRACTISING. As the shooting with the long bow was first introduced in England, and practised almost exclusively for nearly two centuries, so it hath occasioned a peculiar method of drawing the arrow to the ear and not to the breast. That this is contrary to the usage of the ancients is very clear from their reliefs, and from the tradition of the Amazons cutting off one of their paps, as it occasioned an impediment to their shooting. The Finsbury archer is therefore represented in this attitude of drawing to the ear, both in the *Bowman's Glory*, and in the silver badge given by Catharine to the Artillery Company. Not many years ago, there was a man named Topham, who exhibited surprising feats of strength, and who happened to be at a public house near Islington, to which the Finsbury archers resorted after their exercise. Topham considered the long bow as a play thing, only fit for a child; upon which one of the archers wagered a bowl of punch, that he could not draw the arrow two-thirds of its length. Topham accepted this bet with the greatest confidence of winning; but bringing the arrow to his breast instead of his ear, he was greatly mortified by paying the wager, after many fruitless efforts. As to the distance to which an arrow can be shot from a long bow with the best elevation of 45 degrees, that must necessarily depend much both upon the strength and flight of the archer; but in general the distance was reckoned from 11 to 12 score yards. The butts for exercise, were directed to be distant upwards of 220 yards. There is indeed a tradition,

that an attorney of Wigan in Lancashire, named Leigh, shot a mile in three flights; but the same tradition states, that he placed himself in a very particular attitude, which cannot be used commonly in this exercise. According to Neade, an archer might shoot 6 arrows in the time of charging and discharging one musket. The archers consider an arrow of from 20 to 24 drop weight to be the best for flight or hitting a mark at a considerable distance, and yew is the best material of which they can be made. As to the feathers, that of a goose is preferred; it is also wished, that the feather may drop of itself, from a bird 2 or 3 years old. Two out of three feathers in an arrow are commonly white, being plucked from the gander; but the third is generally brown or grey, being taken from the goose; and, this difference, in point of colour, informs the archer when the arrow is properly placed. From this most distinguished part therefore the whole arrow sometimes receives its name: And this by the by, affords an explanation of the grey goose wing in the ballad of Chevyot Chace. Arrows were armed anciently with flint or metal heads, latterly with heads of iron; of these there were various forms and denominations. By an act of the 7th of Henry IV. it was enacted, that all the heads for arrows should be well boiled or brased, and hardened at the points with steel; and that every arrow head should have the mark of the maker: workmen disobeying this order, were to be fined and imprisoned at the king's will and the arrow heads to be forfeited to the crown. Arrows were reckoned by sheaves, a sheaf consisting of 24 arrows. They were carried in a quiver, called also an *arroaw case*, which served for the magazine; arrows for immediate use were worn in the girdle. In ancient times phials of quicklime, or other combustible matter, for burning houses or ships, were fixed on the heads of arrows, and shot from long bows. This has been also practised since the use of gun powder. Neade says, he has known by experience, that an archer may shoot an ounce of fire work upon an arrow 12 score yards. Arrows with wild-fire, and arrows for fire works, are mentioned among the stores at Newhaven and Berwick, in the 1st of Edward VI. The force with which an arrow strikes an object at a moderate distance, may be conceived from the account given by Edward VI. in his journal; wherein he says, that 100 archers of his guards shot before him two arrows each, and afterwards altogether; and that they shot at an inch board, which some pierced quite through, and struck into the other board; divers pierced it quite through with the heads of their arrows, the boards being well seasoned timber: their distance from the mark is not mentioned. To protect our archers from the enemy's horse, they carried long stakes pointed at both ends: these they planted in the earth, sloping before them. In the 1st of Edward VI. 350 of these were in the stores of the town of Berwick, under the article of archer's stakes; there were also at the same time eight bundles of archers stakes in Pontefract castle. To prevent the bow-string from striking the left arm, the arm was covered with a piece of smooth leather, fastened on the out side of the arm; this was called a

bracer; and to guard the fingers from being hurt by the bow string, archers wore shooting gloves. Chaucer describes all these particulars in his prologue to the Canterbury tales.

(II.) ARCHERY, in our ancient customs, a service of keeping a bow for the use of the lord to defend his castle.

(1.) ARCHES, among navigators, is particularly used for the Archipelago.

(2.) ARCHES, a village in Berkshire.

(1.) * ARCHES-COURT. *n. s.* [from *arch* and *court*.] The chief and most ancient court that belongs to the archbishop of Canterbury, for the debating of spiritual causes, so called from Bow-church in London, where it is kept, the top is raised of stone-pillars, built *arch-wise*. The judge of this court is termed the dean of the arches, or official of the *arches-court*; dean of the arches, because with this office is commonly joined a peculiar jurisdiction of thirteen parishes in London, termed a deanery, being exempted from the authority of the bishop of London, and belong to the archbishop of Canterbury; of which parish of Bow is one. Some others say, that he is first called dean of the arches, because the office belongs to the archbishop, the dean of the arches, was substitute in his court; and by that means the names became confounded. The jurisdiction of this judge is ordinary, and extends throughout the whole province of Canterbury; so that upon appeal, he forthwith, and without any further examination of the cause, sends out his citation to the party appealed, and his inhibition to the person from whom the appeal is made. *Cowel*.

(2.) ARCHES-COURT. To Dr Johnson's description, (§ 1.) it is proper to add, that from this court, there lies an appeal to the king in chancery (that is, to a court of delegates appointed by the king's great seal), by statute 25 Henry VI. 19. as supreme head of the English church, in the place of the bishop of Rome, who formerly exercised this jurisdiction; which circumstance alone will furnish the reason why the Popish clergy were so anxious to separate the spiritual court from the temporal.

ARCHES, DEAN OF THE. }

ARCHES, OFFICIAL OF THE. } The chief judge of the ARCHES-COURT. See § 1 and 2.

ARCHESTER, a village of Northumberland, 10 miles from Wellingborough.

* ARCHETYPAL. *adj.* [*archetypus*, Lat.] Original; being a pattern from which copies are made.—

Through contemplation's opticks I have fix'd
Him who is fairer than the sons of men:
The source of good, the light *archetypal*.

(1.) * ARCHETYPE. *n. s.* [*archetypum*, Lat.] The original of which any resemblance is made. Our souls, tho' they might have perceived images of themselves by simple sense; yet it seems incredible, how they should apprehend their *archetypes*. *Glanville's Scenics*.—As a man, a tree, &c. are the outward objects of our perception, and the outward *archetypes* or patterns of our ideas; so our sensations of hunger, cold, are also inward *archetypes* or patterns of our ideas. But the

A solution of archil in water, applied on cold marble, stains it of a beautiful violet, or purplish blue colour, far more durable than the colour which it communicates to other bodies. Mr du Fay says he has seen pieces of marble stained with it, which in two years had suffered no sensible change. It sinks deep into the marble, sometimes above an inch; and at the same time spreads upon the surface, unless the edges be bounded by wax or other like substances. It seems to make the marble somewhat more brittle. Linnæus informs us, in the Swedish Transactions for 1742, that the true archil moss is to be found on the western coasts of England. It has been for a considerable time past prepared by Messrs Gordons at Leith from a species found in the Highlands of Scotland.

ARCHILOCHIAN, a term in poetry, applied to a sort of verses, of which Archilochus was the inventor, consisting of seven feet; the four first whereof are ordinarily dactyls, though sometimes spondee; the three last trochees; *e. g.*

Solvitur acris hyems, grata vice veris & Favoni.

ARCHILOCHUS, a famous Greek poet and musician, was, according to Herodotus, cotemporary with Candaules and Gyges, kings of Lydia, who flourished about the 14th Olympiad, and A. C. 724. But he is placed much later by modern chronologists; viz. by Blair in A. A. G. 686, and by Priestly in 660. He was born at Paros, one of the Cyclades. His father Teleicles was in so respectable a station, that he was chosen by his countrymen to consult the oracle at Delphos concerning the sending a colony to Thasos: but his mother, *Enipo*, was a slave, whom Teleicles, notwithstanding his high rank, made his wife. Though Archilochus showed an early attachment to poetry and music, these arts did not prevent his going into the army; but in the first engagement at which he was present, the young poet, like Horace, and our own Sackling, lost his buckler, though he saved his life by the help of his heels. "It is much easier, (said he,) to get a new buckler than a new existence." This pleasantry, however, did not save his reputation; nor could his poetry or prayers prevail upon Lycambes, the father of his mistress, to let him marry his daughter, though she had been long promised to him. After these mortifications, his life seems to have been one continued tissue of disgrace and resentment; so that the *rage of Archilochus* became proverbial; and the provoking this satirist was compared to the treading upon a serpent; A comparison not too severe, if it be true that Lycambes and his three daughters, were so mortified by his satire, as to be driven to the consolation of a *halter*. In this piece, many adventures are mentioned, full of defamation, and out of the knowledge of the public. There were likewise many loose passages in it; and it is said to have been on account of these that the Lacedemonians laid a prohibition on his verses. However, Plutarch says there is no bard of antiquity by whom the two arts of poetry and music have been so much advanced as by Archilochus. To him is attributed particularly the sudden transition from one rhythm to another of a different kind, and the manner of accompanying these irregular measures upon the lyre. Heroic poetry, in hexameter verse, seems

to have been solely in use among the more ancient poets and musicians; and the transition from one rhythm to another, which lyric poetry required, was unknown to them; so that if Archilochus was the first author of this mixture, he might with propriety be styled the *Inventor of Lyric Poetry*, which, after his time, became a species of versification wholly distinct from heroic.—To him is likewise ascribed the invention of *Epodes*. See *EPODE*. He is also generally ranked among the first victors of the Pythic games: and we learn from Pindar, that his muse was not always a temerary; for though no mortal escaped her rage, yet she was at times sufficiently tranquil and pious to dictate hymns in praise of the gods and heroes. One in particular, written in honour of Hercules, acquired him the acclamations of all Greece; for he sung it in full assembly at the Olympic games, and had the satisfaction of receiving from the judges the crown of victory consecrated to real merit. This hymn, or ode, was afterwards sung in honour of every victor at Olympia, who had no poet to celebrate his particular exploits. Archilochus was at last slain by one Callondas Corax, of the island of Naxos; who, though he did it in battle, according to the laws of war, was driven out of the temple of Delphi, by command of the oracle, for having deprived of life a man consecrated to the Muses. The name of Archilochus and Homer were equally revered and celebrated in Greece, as the two most excellent poets which the nation had ever produced. This appears from an epigram in the *Anthologia*; and from Cicero, who ranks him with poets of the first class, and in his *Epistles* tells us, that the grammarian Aristophanes, the most rigid and scrupulous critic of his time, used to say, that the longest poem of Archilochus always appeared to him the most excellent.

ARCHILUTE. See *ARCILEUTO*.

ARCHIMAGUS, the high-priest of the Persian Magi or worshippers of fire. He resided in the highest fire temple; which was had in the same veneration with them as the temple of Mecca among the Mahometans. Zoroastres first settled it at Balch; but after the Mahometans had overrun Persia in the 7th century, the Archimagus was forced to remove from thence into Kerman, a province of Persia, lying on the southern coast, where it hath continued to this day. Darius Hystaspes took upon himself the dignity of Archimagus: for Porphyry tells us, he ordered before his death, that, among the other titles, it should be engraven on his monument, that he had been *Master of the Magi*; which plainly implies that he had borne this office among them, for none but the Archimagus was master of the whole sect. From hence it seems to have proceeded, that the kings of Persia were ever after looked on to be of the sacerdotal tribe, and were always initiated into the sacred order of the Magi, before they took on them the crown, and were inaugurated into the kingdom.

ARCHIMANDRITE, in ecclesiastical history, was a name given by the ancient Christians to what we now call an *abbot*. Father Simon observes, that the word *mandrite* is Syriac, and signifies a solitary monk. But Covarruvias says it

signifies the leader of a flock, and in this sense we find the name sometimes attributed to archbishops. Among the Greeks, by whom it is chiefly used, it is always restrained to the chief of an abbey.

ARCHIMEDES, a celebrated geometrician, born at Syracuse in the island of Sicily, and related to Hiero king of Syracuse. He was remarkable for his extraordinary application to mathematical studies; in which he used to be so much engaged, that his servants were often obliged to take him from them by force. He had such a burning invention in mechanics, that he affirmed to Hiero, if he had another earth, whereon to plant his machines, he could move this which we inhabit. He is said to have formed a glass sphere, of a most surprising workmanship, wherein the motions of the heavenly bodies were represented. He discovered the exact quantity of the silver, which a goldsmith had mixed with the gold, in a crown he had made for the king: he got the hint of this discovery from his perceiving the water rise up the sides of the bath as he went into it, and was filled with such joy, that he ran naked out of the bath, crying, *Eureka! Eureka!* "I have found it! I have found it!" By the invention of machines, he, for a long time, defended Syracuse on its being besieged by Marcellus. (*See SYRACUSE*.) On the city's being taken, that general commanded his soldiers to have a particular regard to the safety of this truly great man; but his care was ineffectual. "What gave Marcellus the greatest concern (says Plutarch), was the unhappy Archimedes, who was at that time at his museum, and his mind, as well as his eyes, fixed and intent upon some geometrical figures, that he neither heard the noise and hurry of the soldiers, nor perceived that the city was taken. In the depth of study and contemplation, a soldier ran suddenly upon him, and commanded him to follow him to Marcellus; which he refusing to do, till he had finished his problem, the soldier, in anger, drew his sword, and ran him through the heart." This happened A. A. C. 208: Cicero, when he was quæstor in Italy, discovered his tomb, in which was carved a cylinder and sphere. Some of the works of this great mathematician are lost, but others are preserved. His pieces which remain are, 1. Two books of the Sphere and Cylinder. 2. The Dimensions of a Circle. 3. Of Centres of Gravity, or *Æquiponderants*. 4. Of Spheroids and Conoids. 5. Of spiral Lines. 6. The Quadrature of a Parabola. 7. Of the Volume of the Sand. 8. Of Bodies that float on liquids. The best edition of these is that published at London, 1675, 4to. Among the works of Archimedes which are lost, we may reckon the descriptions of the following inventions, which we may gather from himself and other ancient authors. 1. *Περὶ τῆς σφαιρῆς*, or his account of the method which he used to discover the mixture of gold and silver in the crown. 2. His description of the *Κοχλίας*, or *Κοχλίων*, an engine to draw water out of places where it is stagnated. Athenæus, speaking of the prodigious ship built by the order of Hiero, tells us, that Archimedes invented the cochlion, by means of which the hold, notwithstanding its depth, could be drained by one man. (*See SYRACUSE*, *lib. v.*) Diodorus Siculus in-

forms us (*lib. v.*) that he contrived this machine to drain Egypt, and that by a wonderful mechanism it would empty the water from any depth. 3. The *Ελξ*, by means of which (according to Athenæus, *lib. v.*) he launched Hiero's great ship. 4. The *Τετρακων*, of the power of which Tzetzes gives a hyperbolical relation, *Cbil. ii. hist. 35*. 5. The machines he used in the defence of Syracuse against Marcellus. Of these we have an account in Polybius, Livy, and Plutarch. 6. His burning-glasses, with which he is said to have set fire to the Roman galleys. Galen, *Περὶ κρασίων, lib. iii.* 7. His pneumatic and hydraulic engines, concerning which he wrote books, according to Tzetzes.

ARCHIMEDES'S BURNING GLASS. *See BURNING GLASS.*

ARCHIMEDES'S SCREW. *See SCREW.*

ARCHIMIME, or } [from *αρχη*, and *μιμος*, mi-
ARCHIMIMUS, } mic,] an arch-buffoon, or capital mimic. The archimimes, among the Romans, were persons who imitated the manners, gestures, and speech, both of people living, and those who were dead. At first they were only employed on the theatre; but were afterwards admitted to their feast, and at last to their funerals; where they walked after the corpse, counterfeiting the gestures and behaviour of the person who was carried to the funeral pile.

ARCHINTO, a village of Italy, in the Milanese.

(1.) **ARCHIPELAGO**, in geography, a general term, implying a sea interrupted by a great number of islands. The word is formed by corruption of *Ægeopelagus*, *Αἰγαίον Πέλαγος*, the *Ægean Sea*; a name originally given it by the Greeks; but for what reason it is not agreed on. *See ÆGEAN SEA*. To this sea, however, the name is now in some measure appropriated. It is called the *White Sea*, in contradistinction to the *Euxine*, or *Black Sea*; and is that part of the Mediterranean, which lies between Europe and Asia: having the Morea, Livadia and Macedonia on the W. Rumania on the N. Natolia on the E. and the isle of Candia on the S. It contains a great number of islands; such as Andros, Antiparos, Argentiera, Cerigo, Delos, Lemnos, Milo, Metelin, Naxia, Negropont, Paros, Patmos, Rhodes, Samos, Santorin, Scio, Scyros, Tenedos, Tina, &c. All these islands lie between the 35th and 40th degrees of N. lat. Some of them are called *CYCLADES*, because they form, as it were, a crown and circle round Delos; others are called *SPORADES*, as being dispersed, without any order, between Asia and the isle of Candia.

(2.) **ARCHIPELAGO, NORTHERN**, extends between the E. coast of Kamtschatka, and the W. coast of America, and comprehends four clusters of islands: viz. 1. Salignan, containing 5 islands; 2. Khao, including 8 islands; both these groups together are called the Aleuthian islands: 3. the Andreanoffski Ostrova, comprises 16 islands; and, 4. the Lyssie, or Fox islands, include also 16 islands. Modern geographers mention other Archipelagos; such as,

(3.) **ARCHIPELAGO OF LAZARUS**, near the coasts of Malabar and Malacca.

(4.) **ARCHIPELAGO OF MEXICO.**

(5.) **ARCHIPELAGO OF THE PHILIPPINES**, called

called by some the GREAT ARCHIPELAGO, containing the Philippines, the Moluccas, Celebes, &c.

ARCHIPHERACITÆ, [formed of *αρχος*, chief, and the Hebrew or Chaldee, *פרק*, division, or chapter,] ministers in the Jewish synagogues, appointed to read and interpret the Perakim, or titles and heads of the law, and the prophets. Grotius supposed them the same with the ARCHISYNAGOGUES, but they were rather the chiefs of these.

ARCHIPPUS, a noted preacher of the gospel at Colosse.

ARCHIPRESBYTER, or ARCH-PRIEST, a priest established in some dioceses with a superiority over the rest. He was anciently chosen out of the college of presbyters at the pleasure of the bishop. These archipresbyters were much of the same nature with deans in the cathedral churches, as the college of presbyters answers to the chapter. See PRESBYTER.

ARCHISTRATEGUS, the generalissimo, or captain general of an army. See STRATEGUS.

ARCHISYNAGOGUS, the chief of the synagogue; the title of an officer among the Jews, who presided in their synagogues and assemblies. The number of these officers was not fixed, nor the same in all places; there being 70 in some, and in others only one. They are sometimes called *princes* or *angels* of the synagogue, and had a power of whipping or excommunicating such as deserved these punishments.

(1.) * ARCHITECT. *n. f.* [*architectus*, Lat.] 1. A professor of the art of building.—The *architect's* glory consists in the designment and idea of the work; his ambition should be to make the form triumph over the matter. *Wotton*. 2. A contriver of a building; a builder —

The hasty multitude

Admiring enter'd, and the work some praise,
And some the *architect*: his hand was known
In heav'n, by many a tow'ring structure high,
Where scepter'd angels held their residence,
And sat as princes. *Milton*.

3. The contriver or former of any compound body.—This inconvenience the divine *architect* of the

body obviated. *Ray on the Creation*. 4. The contriver of any thing.—

An irreligious Moor,

Chief *architect* and plotter of these woes. *Shaksp.*

(2.) ARCHITECT, may be more accurately defined, a person who forms plans and designs edifices, conducts the work, and directs the artificers employed in it. The most celebrated architects are Vitruvius, Palladio, Scamozzi, Serlio, Vignola, Barbaro, Cataneo, Alberti, Violli, Inigo Jones, De Lorme, Perrault, S. Le Clerc, Sir Christopher Wren, and the Earl of Burlington: to whom we may add Mylne, the Adamsons and others of our own country. Vitruvius enumerates 12 qualities requisite to constitute a great *architect*; that he be docile and ingenious; well educated; skilled in designing, in geometry, optics, arithmetic, history, philosophy, music, medicine, law, and astronomy. Close application to the study of ancient masters, and the examining works of the ancients, together with judgment and taste to select, and apply the hints which these examples afford, joined to a peculiar genius for the study of this art, are necessary to render an architect eminent in his profession.

* ARCHITECTIVE. *adj.* [from *architectus*.] That performs the work of architecture.—How could the bodies of many of them, particularly the last mentioned, be furnished with *architective* materials? *Derham's Physico-Theology*.

ARCHITECTOGRAPHIA, the description of ancient buildings, temples, theatres, arches, pyramids, baths, gates, aqueducts, tombs, and the like.

ARCHITECTONICE, [*αρχιτεκτονικη*, Gr.] See ARCHITECTURE.

* ARCHITECTONICK. *adj.* [from *αρχι*, chief, and *τεκτων*, an artificer.] That which has the power or skill of an architect; that which can build or form any thing.—To say that some modern fine part of either, or all the hypostatical principle, is the architect of this elaborate structure, to give occasion to demand, what proportion the tria prima afforded this *architectonick* tower, and what agent made so skilful and happy a structure. *Boyle*.

A R C H I T E C T U R E.

INTRODUCTION.

SECT. I. DEFINITIONS, and DIVISIONS of ARCHITECTURE.

(1.) DR JOHNSON gives the following definitions of the word, and divisions of the science of ARCHITECTURE.

(2.) * ARCHITECTURE. *n. f.* [*architectura*, Lat.] 1. The art or science of building. *Architecture* is divided into *civil architecture*, called by way of eminence *architecture*; *military architecture*, or fortification; and *naval architecture*, which, besides building of ships and vessels, includes also ports, moles, docks, &c. *Chambers*.—

Our fathers next in *architecture* skill'd,

Cities for use, and forts for safety build:
Then palaces and lofty domes arose,
These for devotion, and for pleasure those.

Blackmore

2. The effect or performance of the science of building.—The formation of the first earth ball, a piece of divine *architecture*, ascribed to a particular providence. *Burnet's Theory*.

(3.) To the above definitions it is proper to add that, although ARCHITECTURE, in its utmost latitude, may be defined a mathematical science containing rules for designing and raising ALL sorts of structures, according to geometrical proportion; yet, in its ordinary acceptation, and which we mean here to consider it, it is applied

only to the construction of such buildings, as are necessary for the purposes of CIVIL life, such as houses, churches, halls, bridges, porticoes, &c.

SECT. II. HISTORY of ANCIENT ARCHITECTURE.

(4.) This art, we are assured, is as old as Cain: for Moses tells us that he built a city; though what were the materials, or how the buildings were constructed, we are entirely ignorant. It is commonly said, that the first materials employed in building were twigs of trees, wherewith men constructed huts, such as the *wigwams* in use among the American Indians at present. This, however, appears disputable. The natural shelter afforded by hollows in the sides of mountains or rocks, it may be supposed, would much more readily suggest the idea of using stones and earth as materials for building houses. Indeed, considering that tents were not invented before the days of Jabel, Tubal-Cain's brother, it is very probable that such temporary houses as the Indian wigwams were not originally known; otherwise the method of covering poles with the skins of beasts, instead of small branches or twigs, must very soon have taken place.

(5.) These temporary houses seem to have come into use only when men began to lead an idle wandering life, like the Tartars, and could not be at the trouble of constructing durable habitations in every place where they were obliged to wander with their cattle; and Jabel perhaps thus took the hint of making portable houses or tents. Accordingly we see, that no nations, except those who are in a perpetually unsettled state, make use of such portable materials. Even in America, where the human race has appeared in the rudest form, they were no sooner collected into great bodies under the emperors of Mexico and Peru, than new buildings began to be erected. We are not, therefore, to look for the origin of architecture in any single nation; but in every nation, when the inhabitants began to leave off their savage way of life, and to become civilized. The origin of regular building hath been deduced from the construction of the meanest huts in a very natural and probable manner by several authors.

(6.) "Anciently (says Vitruvius) men lived in rocks, and inhabited caves; but in time, taking perhaps from birds, who with great industry build their nests, they made themselves huts. At first they made these huts, very probably, of a conic figure; because that is a figure of the simplest structure; and, like the birds, whom they imitated, composed them of branches of trees, spreading them wide at the bottom, and joining them in a point at the top; covering the whole with reeds, leaves, and clay, to screen them from tempests and rain.

(7.) "But finding the conic figure inconvenient on account of its inclined sides, they changed both the form and construction of their huts, giving them a cubical figure, and building them in the following manner: Having marked out the space to be occupied by the hut, they fixed in the ground several upright trunks of trees to form the sides, filling the intervals between them with branches closely interwoven and covered with clay. The sides being thus completed, four large

beams were placed on the upright trunks; which, being well joined at the angles, kept the sides firm, and likewise served to support the covering or roof of the building, composed of many joists, on which were laid several beds of reed, leaves, and clay.

(8.) "Insensibly mankind improved in the art of building, and invented methods to make their huts lasting and handsome as well as convenient. They took off the bark, and other unevennesses, from the trunks of trees that formed the sides; raised them, probably, above the dirt and humidity, on stones; and covered each of them with a flat stone or slate, to keep off the rain. The spaces between the ends of the joists were closed with clay, wax, or some other substance; and the ends of the joists covered with thin boards cut in the manner of triglyphs. The position of the roof was likewise altered: for being, on account of its flatness, unfit to throw off the rains that fell in great abundance during the winter season, they raised it in the middle; giving it the form of a gable roof, by placing rafters on the joists, to support the earth and other materials that composed the covering.

(9.) "From this simple construction the orders of architecture took their rise. For when buildings of wood were set aside, and men began to erect solid and stately edifices of stone, they imitated the parts which necessity had introduced into the primitive huts; in so much that the upright trees, with the stones at each end of them, were the origin of columns, bases, and capitals; and the beams, joists, rafters, and strata of materials that formed the covering, gave birth to architraves, frizes, triglyphs, and cornices, with the corona, the mutules, the modillions, and the dentils."— See the representations of primitive huts in *plate XX. Fig. 1, 2, and 3.*

(10.) "The first buildings were in all likelihood rough and uncouth; as the men of these times had neither experience nor tools: but when, by long experience and reasoning upon it, the artists had established certain rules, had invented many instruments, and by great practice had acquired a facility in executing their ideas, they made quick advances towards perfection, and at length discovered certain manners of building, which succeeding ages have regarded with the highest veneration."

(11.) From the earliest antiquity the Egyptians have been considered as the inventors of arts; and in the time of their prosperity all nations sought and studied their philosophy and their sciences; so that being learned in the arts of the Egyptians became proverbial. Among other arts derived from them, architecture is generally enumerated; but this is to be understood as meaning only that species of original architecture, where the strength of the fabric was more regarded than its elegance or symmetry. Of this kind are the pyramids; the ruins also of a magnificent temple at Luxor, (the ancient Thebes,) of which there remain more than 130 columns, all of considerable magnitude, and some so large as ten feet in diameter, with neat not to say elegant sculpture; besides several other remains in the same neighbourhood. At Komonbu, and other parts of Egypt, there exist

other relics of magnificent works of architecture, as shewn by Norden. From these wonders which still remain we can only conjecture what have been destroyed.

(12.) It is not, therefore, unreasonable to conclude, that from Egypt, where the cotemporary nations sought the arts and studied the sciences, the Greeks derived their first ideas of building, but which were so changed and improved by being thus transplanted, that it can scarcely be known from what stock they had their origin. The Greeks, anxious to add elegance to convenience, disregarded the massive and ponderous architecture of the Egyptians; whose ignorance of the arch made it absolutely necessary for them to have small spaces between their columns, and to burthen their edifices with large and strong architraves.

(13.) This, therefore, may be considered as the probable track by which architecture rose to elegance; for certainly the structures of Egypt are much more ancient than those of Greece; and as it may be considered the best character of buildings that they provide for the comfort and convenience of man, so it must be allowed that the Greeks first rendered them productive of grace, regularity, and beauty: for, to the fine eye, skilful hand, and sublime genius of that nation is architecture indebted for its rules of harmony, elegance of design, and taste of ornament, which began to arrive at perfection under the fostering care of Pericles; which period, including the reign of Alexander the Great, must be considered as its climax of grace, elegance, and beauty, in Greece.

(14.) It is a most indubitable fact, that the mind of man is influenced by modes of government: and it is certain that the Greeks, with their independence, lost also their superior vigour of genius; and what remained was, with the spoils of their cities, carried to Rome. Hence it is that, from this period, the Romans are to be considered as the encouragers and patronisers of architecture. From this period also its progress was great and rapid, though little was done that could be remarked for its novelty; but the rules of the Greeks were applied to structures so numerous, and of such wonderful extent, that we doubt which most to admire, the original inventors of these sublime rules, or those who applied them to such stupendous buildings.

(15.) Some authors have attempted to prove, that, from the Etruscans, and not from the Egyptians, the Greeks imbibed their first ideas of architecture. The Etruscans (or Tuscans) certainly were well skilled in building, and from them the Romans in their early state sought help in all their large works. The remains of the temple of Jupiter Capitolinus, the Cloaca Maxima, &c. the works of Tuscan artists, shew them to have well understood the science and the practice of useful and elegant architecture. Neither when we inspect the antique vases, of undoubted Etruscan workmanship, can we deny them to have possessed taste and elegance. But from whatever nation the Greeks first acquired their taste for architecture, it must be allowed that they completed the science, by uniting the useful and the agreeable in all their designs.

(16.) But it is not a little remarkable, that improvements in architecture did not take place in any nation till after, or about the time that Jerusalem was taken by Nebuchadnezzar. The grandest buildings erected among the Assyrians seem to have owed their existence to this monarch; and it can scarce be imagined that he would not endeavour to imitate the architecture of Solomon's temple, to which, by his conquest of Jerusalem, he had full access.—It is also remarkable, that the dimensions of the two pillars, Jachin and Boaz, set up by Solomon, very nearly correspond with those of the Doric order, first invented by the Greeks, and which originally came from their colonies settled in Asia Minor. The height of Solomon's pillars, without the chapter, was 18 cubits; that of the chapter itself was 5 cubits; the circumference was 12 cubits; from whence, according to the Scripture language, we may reckon the diameter to have been exactly 4 cubits.—Had they been a single cubit higher, they would have been precisely of the same height with columns of the original Doric order.

(17.) We do not mean positively to affirm, that this famous temple gave a model of architecture to the whole world; although it is scarce conceivable, but that imitations of it, as far as it could be known, must have taken place among many nations. But that no such imitations had reached Greece, and that Grecian architecture was in a great state of improvement, for some ages after Solomon, is certain; for Homer, who was cotemporary with Jehoshaphat, and whom some chronologists place even so low as Hezekiah, gives us no account of any thing like columns of stone, in all his writings; but uses a word, which makes it probable that the columns in his time were no thing better than bare wooden posts.

(18.) It must be allowed, however, that the ancient Egyptian buildings, with all their defects, had an air of vast grandeur and magnificence, and we may credit the description given of one of their banqueting rooms by Vitruvius. The usual size of one of these rooms was from 100 to 150 feet in length, and its breadth somewhat more than half its length. At the upper end, and along the two sides, they placed rows of pillars tolerably well proportioned to one another, though not of any regular order; and at the lower part they made a magnificent and spacious entrance: the whole, with its ornaments, seems to have taken up one end of the building entire. We are not told that there were any pillars there; though perhaps they placed two or more toward the angles on each side, for uniformity, the central space being enough for an entrance in the grandest and most august manner. These rows of columns were set at a distance from the wall, forming a noble portico along the two sides and upper end of the building. Upon the pillars was laid an architrave; and from this was carried up a continued wall with three quarter columns, answering directly to those below, and in proportion one fourth smaller in all their parts. Between these three quarter columns were placed the windows for enlightening the building. From the tops of the lower pillars to the wall was laid a floor: this covered the portico overhead within, and made on the outside

outside a platform, which was surrounded by a corridor with rails and balusters. This was terraced, and served as a plain for people to walk on; and from this they could look through the windows down into the room. To this terrace there was no covering required, as the Egyptians were in no fear of rain. The Egyptians decorated this sort of building with statues; and no kind of ornament could answer it so well, as the light cannot fall upon statues to such advantage in any direction, as when it comes from above, in such a regular, proportioned, and uninterrupted manner.

(19.) Among the ancient Egyptians, Persians, and Babylonians, the vast strength and extent of their buildings seem to have been what they chiefly valued; and in this they certainly as much excelled the Greeks and modern nations, as the latter excel them in the beautiful proportion and elegance of their structure. Some modern authors, however, endeavour to deprive the ancients of what is justly their due, and will have everything to be exaggerated, which seems beyond the power of modern princes to accomplish. In this way, M. Goguet remarkably distinguishes himself; and that without giving any reason at all. Speaking of the wonders of ancient Babylon, "All these works (says he,) so marvellous in the judgment of antiquity, appear to me to have been extremely exaggerated by the authors who have spoken of them. How can we conceive, in effect, that the walls of Babylon could have been 313 feet high, and 81 in thickness, in a compass of near ten leagues?" To this we may easily reply, that the pyramids of Egypt, and the immense wall which divides China from Tartary, show us, that even such a work as the wall of ancient Babylon is said to have been, is not altogether incredible. The lowest computation of the dimension of the Chinese wall is, that it extends in length 1200 miles, is 18 feet high at a medium, and as many thick; according to which computation, it must contain 9,504,000 solid fathoms; and yet, if we may credit the Chinese historians, this immense mass of building was finished in five years. If, therefore, we can suppose Nebuchadnezzar, to have been capable of employing as many men for 10 years, as were employed in raising the Chinese wall, (which is not very improbable, considering the vast number of captives he carried to Babylon,) we may suppose him able to have fortified the city of Babylon, as strongly as it is said to have been; for the mass of building is not quite double that of the Chinese wall, though nearly so, amounting to 18,189,600 solid fathoms.

(20.) But M. Goguet argues, that "infinitely more money has been expended, and much more genius required, as well as more power, taste, and time, to finish Versailles, with all its defects, than to construct a pyramid, or erect an obelisk." The genius, taste, and time, we shall not dispute; but as the same author confesses, that 100,000 men were employed for 30 years together, in the construction of the largest pyramid, we think the power may justly be doubted; when we consider what time the above-mentioned number of men would have taken to accomplish some of the works of which M. Goguet boasts so much. The

Vol. II. Part II.

canal of Languedoc, he tells us, extends in length, upwards of 70 leagues, and required the removal of two millions of cubic fathoms of earth. This was no doubt a great work; but had 100,000 men been employed upon it at once, they must have removed this quantity of earth in three weeks, supposing each to have removed only a single fathom a day. Nor can we imagine, that any modern work will stand in competition with the works of the ancients, as to greatness, whatever they may do in other respects.

(21.) To attempt to produce an authority for every species of ornament which belongs to the different orders, would be engaging in a fruitless enquiry. It may not be amiss, however, to bestow a few remarks on such particular parts as may, with some degree of certainty, have their origin pointed out.

(22.) The PLINTH, it is very reasonable to imagine, was, at first, simply a square tile or stone, placed under the trunk of the tree or primitive column, to prevent rotting, to which it was exposed, from the constant moisture of the earth; it also served as a more firm and solid footing to the column. There are instances of several buildings of considerable elegance and extent, which have no plinth to the columns; such as the temple of Erectheus at Athens, the temple of Vesta at Tivoli, and some other places; and in all the Doric temples.

(23.) The TORUS, or swell above the plinth, may have originated from the root or lower part of the tree being thicker than the part above, which also fixed it more firmly on the plinth; or, as by some it is conjectured to have been, only a rope or bandage round the trunk, to prevent its splitting: or, according to Vitruvius, it represents the shoe.

(24.) The idea of the CAPITAL may have originally been suggested by some tree, whose arms spreading, just above where it was necessary the upper parts should be cut off, to be of a proper length, the swell of the arms very likely gave the first idea of the swell of the capital, which was also attended with this advantage; by being broader on the top, it was better formed for receiving the works above.

(25.) The ABACUS was certainly no more than a tile or stone, placed with intent to throw off the water, and prevent its sinking into the column, which would have endangered the duration of the building. The ASTRAGALS and FILLETS were bandages to bind the column. The ARCHITRAVE we may conceive to have been the beams or ties, necessary to unite the columns together. The FRIEZE was a necessary addition when height within was wanted.

(26.) The CORNICE, and its ornaments, were the ends or outer edges of the timbers, rafters, &c. necessary to support the roof. The DENTELLES, TRIGLYPHS, MODILLIONS, &c. from the above source also, were accidental hints improved, when to usefulness was wished to be added ornament; and which became permanent, when structures of wood gave place to more elegant and durable ones of stone.

(27.) The ORDERS, among ancient and modern architects, are 5, viz. The *Tuscan*, the *Doric*, the

F f f

Ionic,

Ionic, the *Corinthian*, and the *Composite*; which are distinguished from each other by the column with its base and capital, and by the entablature. See plate X.

(28.) The *TUSCAN* order is characterised by its plain and robust appearance, and is therefore used only in works, where strength and plainness are wanted; it has been used with great effect and elegance, in that durable monument of ancient grandeur, the Trajan column at Rome; indeed, general consent has established its proportions for such purposes, beyond all others.

(29.) The *DORIC* possesses nearly the same character for strength, as the Tuscan, but is enlivened by its peculiar ornaments; the triglyph, mutule, and guttæ or drops, under the triglyph: these decorations characterize the Doric order, and in part are inseparable from it. Its proportions recommend it where united strength and grandeur are wanted.

(30.) The *IONIC* partakes of more delicacy than either of the former, and therefore, as well as on account of its origin, is called *Feminine*, and not improperly supposed to have a matronic appearance. It is a medium between the masculine Tuscan and Doric, and the virginal slenderness of the *Corinthian*: the boldness of the capital, with the beauty of the shaft, makes it eligible for porticoes, frontispieces, entrances to houses, &c. Denticles were first added to the cornice of this order.

(31.) The *CORINTHIAN* possesses more delicacy and ornament, than any other order; the beauty and richness of the capital, and the delicacy of the pillar, render it the most suitable in those edifices, where magnificence and elegance are required. On this account, it is frequently used for the internal decoration of large state rooms; in which it has a chaste appearance, though at the same time superb.

(32.) The *COMPOSITE* or Roman order is the same as the *Corinthian* in its proportions, and nearly alike in ornamental properties. The addition of the modern *Ionic* volute to the capital, gives a bolder projection. It is applicable in the same cases as the *Corinthian*.

(33.) The Romans borrowed their architecture from the Greeks, but did not imitate them in the structure of their private dwellings in every particular. Their magnificence, however, in their temples and public buildings, is yet to be seen in what remains of them, and which are not only models for all modern architects, but have never been surpassed, or even equalled, to this day.—But though the art of architecture continued almost at its highest pitch among the Romans for two centuries, it declined exceedingly as the empire began to fail. Tacitus relates, that after the battle of Actium, no men of genius appeared; and after the reign of Alexander Severus, a manner of building, altogether confused and irregular was introduced, wherein nothing of the true graces and majesty of the former was preserved.

SECT. III. HISTORY of MODERN ARCHITECTURE.

(34.) ON the decline of architecture among the Romans, and when the empire was entirely over-

run by the Goths, the latter naturally introduced their own methods of building. Like the ancient Egyptians, the Goths seem to have been more studious to amaze people with the greatness of their buildings than to please the eye with the regularity of their plans, or the propriety of their ornaments. They corrected themselves, however, a little by the models of the Roman edifices, which they saw before them: but their models themselves were faulty; and the Goths being totally destitute of genius, neither architecture nor any other art could be improved by them.

(35.) Those ancient buildings in this island which have gone under the indiscriminate denomination of *GOTHIC*, our modern antiquaries have, more accurately, divided into *SAXON*, *NORMAN*, and *SARACENIC*, or that species vulgarly though improperly, called *MODERN GOTHIC*.

(36.) Some maintain, that the Saxon churches after they began to be built with stone, consisted only of upright walls, without pillars or arches, the construction of which, it is alledged, they were entirely ignorant of. But it is highly improbable, that the Saxons could be ignorant of so useful a contrivance as the arch. Many of them built by the Romans, they must have had before their eyes; and it is not to be believed, that once knowing them and their convenience, they would neglect to use, or, having used, would relinquish them. Besides, as it appears from undoubted authorities, they procured workmen from the Continent, to construct their capital buildings, “according to the Roman manner,” this alone would be sufficient to confute that ill founded opinion, and at the same time prove, that what we commonly call Saxon, is in reality, Roman architecture.

(37.) This style of building was practised all over Europe, and continued to be used by the Normans, after their arrival here, till the introduction of what is called the *MODERN GOTHIC*, which did not happen till about the end of the reign of Henry II. so that there seems to be little or no ground for a distinction between the Saxon and Norman architecture. The ancient parts of most of our cathedrals are of this early Norman work, the characteristic marks of which are these:

(38.) The walls are very thick, generally without buttresses; the arches, both within and without, as well as those over the doors and windows, semicircular, and supported by very clumsy columns, with a kind of regular base and capital. In short, plainness and solidity constitute the striking features of this method of building. Yet the architects of those days sometimes deviated from this rule. Their capitals were adorned with carvings of foliage, and even animals; their massive columns exhibited small half columns united to them, and their surfaces ornamented with spirals, squares, lozenge net-work, and other figures, either engraved or in relief.

(39.) Various instances of these may be seen in the cathedral of Canterbury, particularly the undercroft, the monastery of Lindisfarne or Holy Island, the cathedral at Durham, and the ruined choir at Orford in Suffolk. The columns, figs. 1, 2, 3, 4, pl. XXI. are at the monastery of Lindisfarne or Holy

ARCHITECTURE.

PL. X.

Tuscan.

Doric.

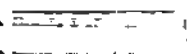
Ionic.

5 1/2 ft
5 7/8 in

4 1/2 in

see
Cornice

Projected



Base

Corinthian.



Angular view of the Corinthian Capital



Composite.

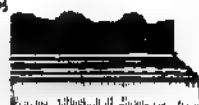


Plan.

Doric Scull
an Ornament in the Doric Order



5 1/8 in



Base of the Encyclopaedia Britannica

that people, who were as industrious as they were brave, quickly adorned every country that they conquered. They not only built a prodigious number of solid, convenient, and magnificent structures for their own accommodation, but they exhorted, encouraged, and instructed the Britons to imitate their example. Indeed this was one of the arts which Agricola, the most excellent of the Roman governors, employed to civilize the Britons, and reconcile them to the Roman government.

(47.) But not very long after this period, architecture and all the arts connected with it began to decline very sensibly in Britain, and in all the provinces of the western empire. This was partly owing to the building of Constantinople, which drew many of the most famous architects and other artificers into the east, and partly to the irruptions and depredations of the barbarous nations. But the final departure of the Romans occasioned an almost total destruction of architecture in this island. For the people they left behind, having neither skill nor courage to defend their numerous towns, forts, and cities, suffered them first to be plundered, and then destroyed, by their ferocious invaders. Thus, the many noble structures, with which Provincial Britain had been adorned by the art and industry of the Romans, were ruined or defaced in a very short time; and the unfortunate Britons were equally incapable of repairing them, and of building others in their room. That long succession of miseries in which they were involved by the irruptions of the Scots, Picts, and Saxons, deprived them of the many useful arts which they had learned from their former masters, and lodged them once more in forests, dens, and caves, like their savage ancestors.

(48.) The most wanton and extensive devastations were those committed by the Anglo-Saxons; among whom it seems to have been a maxim, to destroy all the towns and castles which they took from their enemies, instead of preserving them for their own use. It cannot be supposed, that a people, who wantonly demolished so many beautiful and useful structures, had any taste for the arts by which they had been erected. The truth is, that the Anglo-Saxons, at their arrival in this island were almost totally ignorant of these arts; and, like all the other nations of Germany, had been accustomed to live in wretched hovels, built of wood or earth, and covered with straw or the branches of trees; nor did they much improve in the knowledge of architecture for 200 years after their arrival.

(49.) During that period, masonry was quite unknown and unpractised in this island; and the walls even of cathedral churches were built of wood. The first cathedral of York was built of the same materials; and a church of stone was esteemed a kind of prodigy in those times, that merited a place in history. Masonry was restored, and some other arts connected with it introduced into England, towards the end of the 7th century, by two clergymen, who were great travellers, and had often visited Rome, where they had acquired some taste for architecture. These were, the famous Wilfrid bishop of York, and afterwards of Hexham, and Benedict Biscop, founder of the abbey of Weremouth.

(50.) WILFRID, who was one of the most ingenious, active, and magnificent prelates of the 7th century, was a great builder, and erected several structures at York, Rippon, and Hexham, which were the admiration of the age in which he flourished. The cathedral of Hexham, which was one of these structures, has some vestiges still remaining. It was built by masons and other artificers brought from Rome by the munificence of its generous founder.

(51.) BENEDICT BISCOP was the cotemporary and companion of Wilfrid in some of his journeys, and had the same taste for the arts. He made no fewer than six journeys to Rome, chiefly with a view of collecting books, pictures, statues, and other curiosities, and of persuading artificers of various kinds to come from Italy and France and settle in England. But though the art of building edifices of stone, with windows of glass and other ornaments, was thus introduced by these two prelates in the latter part of the 7th century, it does not seem to have flourished much for several centuries after. It appears from many incidental hints in our ancient historians, that stone buildings were still very rare in the eighth and ninth ages; and that when any such buildings were erected, they were the objects of much admiration.

(52.) In the other parts of this island architecture was in a still less flourishing state. After the ancient Britons had retired to the mountains of Wales, in consequence of the incursions of the Danes, the spirit of architecture seems to have been almost totally extinct. Such was the poverty of Britain at this period, that a royal residence or palace in Wales, with all its offices, was valued at L.5. and 80 pence of the money of that age, equal in quantity of silver to L.16 of our money, and in efficacy to L.160! Even the castles in Wales, that were built for the safety of the country, were constructed of the same materials as those of which their palaces consisted; namely, of wands, with their barks peeled off, wrought into wicker in the manner of our baskets! Such were the flimsy materials which formed the side walls of edifices designed for defence, even against the attacks of an enemy, and whence it was that the laws required the king's vassals to come to the building of these castles, with no other tool than an axe.

(53.) The arts of building among the Scots and Picts, at this period, do not seem to have undergone much improvement. In the beginning of the 8th century, however, they began to make some advances, as appears from some edifices yet remaining in Scotland. These buildings are all circular, and so extremely various in style, that they rather seem to be works of different ages and nations, than of one age and country. Some of the largest of these structures are of an extraordinary taste of architecture, and are described by Mr Gordon, in his *Itinerarium*, as follows:

(54.) "Having arrived at the barrack of Glenelg, I was conducted to the remains of those stupendous fabrics, seated about two miles from thence, in a valley called Glenelg, in which 4 of them are still standing. The first I met with is called *Glenelg Castle*, or *MALCOLM'S CASTLE*. It stands upon

upon a considerable eminence, and affords a fine prospect of the isle of Sky and the sea coast. The foundation of this only appears; as also of that other, on the E. end of the valley, called CASTLE CHONEL. About a quarter of a mile further, upon the bank of a rivulet, which passes through the middle of the glen, stands that called CASTLE TELLVE. I found it composed of stones without cement; not laid in regular courses after the manner of elegant buildings, but rudely and without order. Those toward the base were pretty large: but those on the top scarcely exceeded the thickness of a common brick. I was surprised to find no windows on the outside, nor any manner of entrance into the fabric, except a hole towards the west at the base, so very low and narrow, that I was forced to creep in upon my hands and knees, and found that it carried me down 4 or 5 steps below the surface of the ground. When I was got within, I was environed betwixt two walls, having a cavity or void space which led me round the whole building. Opposite to the little entry on the outside was a pretty large door in the second or inner wall, which led me into the area or inner court. When I was there, I perceived, that one half of the building was fallen down, and thereby had the opportunity of seeing a complete section thereof. The two walls joined together at the top, round about, and have formed a large void space or area in the middle."

(55.) "But (continues Mr Gordon) to give a more complete idea of these buildings, I shall describe the fourth, called CASTLE TRODDAN, which is by far the most entire of any of that country, and from whence I had a very clear notion how these fabrics were originally contrived. The area of this makes a complete circle; and there are four doors in the inner wall, which face the four cardinal points of the compass. These doors are each $8\frac{1}{2}$ feet high and 5 feet wide, and lead from the area into the cavity between the two walls which run round the whole building. The perpendicular height of this fabric is exactly 23 feet; the thickness of both walls, including the cavity between, no more than 12 feet; and the cavity itself is hardly wide enough for two men to walk abreast; the external circumference is 178 feet. The whole height of the fabric is divided into 4 parts or stories separated from each other by thin floorings of flat stones, which knit the two walls together, and run quite round the building; and there have been winding stairs of the same flat stones ascending betwixt wall and wall up to the top. Over each door are 9 square windows, in a direct line above each other, for the admission of light; and between every row of windows are 3 others in the uppermost storey, rising above a cornice, which projects out from the inner wall and runs round the fabric."

(56.) From the above description of these singular edifices it plainly appears, that they were designed, both for the purpose of defence and lodging; and considering the times in which they were erected, they seem to have been pretty well calculated for both these purposes. The stone edifices of the other kind, which were probably erected in this period, and of which some few are

still to be seen in Scotland, are not so large as the former, but more artificial.

(57.) These are slender, lofty, circular towers, of fine stone, laid in regular rows between 40 and 50 feet in external circumference, and from 70 to 100 feet high, with one door some feet distant from the ground. They are exactly similar to the round tower of Ardmore, and several others, in Ireland. It is therefore probable that they were both built about the same time, in the 10th century, and for the same purpose, which some believe was for the confinement of penitents, while they were performing penance. On this account these towers are always found in the neighbourhood of churches both in Scotland and Ireland; and are said to have been used in this manner: The penitents were placed in the uppermost storey of the tower (which commonly consisted of five or six stories); where having made probation, or done penance, such a limited time, according to the heinousness of their crimes, they then were permitted to descend to the next floor, and so on by degrees, until they came to the door, which always faced the entrance of the church, where they stood to receive absolution from the clergy, and the blessings of the people. A tedious process, to which few penitents in the present age would willingly submit. Others are of opinion, that the design of these circular towers (of which one is still remaining at Abernethy and another at Brechin) was to be places from whence the people were called to public worship, by the sound of a horn or trumpet, before the invention of bells.

(58.) Architecture, in the 12th century, received very great improvements, in consequence of the religious zeal of the clergy, who inspired all ranks of people with an ardour for pulling down the old churches, and building more elegant and splendid ones in their stead. In the time of Henry I. all the ancient edifices, that had been raised in the days of Edgar, Edward, &c. were demolished, and others of greater magnitude and magnificence, and of more elegant workmanship erected. A similar spirit pervaded Scotland, in proportion to its extent and riches. King David I. alone, besides several cathedrals and other churches, built no fewer than 13 abbeys and priories, some of them very magnificent.

(59.) The sacred architecture of the Anglo-Normans in the beginning of this period, did not differ much in its style and manner from that of the Anglo-Saxons: their churches being in general plain, low, strong, and dark; the arches both of the doors and windows semicircular, with few or no ornaments. By degrees, through much practice, our architects, who were all monks or clergymen, improved in their taste and skill, and ventured to form plans of more noble, light, and elevated structures, with a great variety of ornaments; which led to that bold magnificent style of building, commonly, though perhaps not very properly, called *the* LATER GOTHIC.

(60.) It is not improbable that, our monkish architects were assisted in attaining this style of building, by models from foreign countries, or by instructions from such of their own number as had visited

visited Italy, France, Spain, or the East. Its first appearance in England was towards the latter end of the reign of Henry II. But it was not at once thoroughly adopted, some short solid columns and semicircular arches being retained and mixed with the pointed ones. In the reign of Henry III. however, this manner of building seems to have gained a complete footing; the circular giving way to the pointed arches, and the massive columns giving place to the slender pillars: and such was their passion for this new taste, that many of their strong ancient buildings were pulled down, and re-constructed after the model of this new architecture.

(61.) The present cathedral church of Salisbury was begun early in this reign, and finished in 1258. Its style is Saracenic, and according to Sir Christopher Wren, it is one of the finest productions of architecture of the age in which it was built. It is built on one entire plan, and at one time, by which it distinguishes itself from some other cathedrals, which have been built at different periods, and in various styles. From this time till Henry VIII. the fashionable pillars in churches were of Purbec marble, very slender and round, encompassed with marble shafts a little detached, having each a capital adorned with foliage, which joining, formed one elegant capital for the whole pillar. The windows were long and narrow, with pointed arches and painted glass. In this century, lofty steeples, spires, and pinnacles, were much the taste in building churches.

(62.) In the 14th century, pillars consisted chiefly in an assemblage of shafts not detached, but united, forming one solid and elegant column. Their windows, especially those of the east and west ends were large, and divided by stone mullions running into ramifications above, and forming numerous compartments in various fanciful shapes. Those windows were filled with stained glass of the most lively colours, on which were represented kings, saints, and martyrs, and their histories. Yet, notwithstanding the perfection to which architecture had attained in these instances, this art, as applied to common dwelling-houses, did not receive a proportionate degree of improvement, if any at all: for even in the city of London, towards the end of the 14th century, the houses of mechanics and common burghesses were built of wood and covered with straw or reeds. That numerous and useful body of men were in fact in a state of great depression in those times, when the arts of popery were practised to render them the servile instruments of the priesthood; and consequently little attention was paid to the convenience, much less to the elegance of their dwellings.

(63.) Towards the close of the reign of Henry VII. a new kind of low-pointed arch was much in use. It was described from four centres, (see Plate XX,) was very round at the haunches, and the angle at the top was very obtuse. This sort of arch is to be found in all cardinal Wolsey's buildings; also at West Sheen; an ancient brick gate at Mile End, called *King John's Gate*; and in the great gate of the palace of Lambeth.

(64.) From this period Gothic architecture began to decline; and was soon after supplanted by

a MIXED STYLE, if one may venture to call it so; wherein the Grecian and Gothic, however discordant and irreconcilable, were jumbled together. Concerning this mode of building, Mr Warton remarks, that "Although the Roman or Grecian architecture did not begin to prevail in England till the time of INIGO JONES, yet our communication with the Italians, and our imitation of their manners, produced some specimens of that style much earlier. Perhaps the earliest was Somerset House in the Strand, built about the year 1549, by the duke of Somerset, uncle to Edward VI." In 1613, the magnificent portico of the schools at Oxford was erected, in which, along with the old Gothic style, the architect has affectedly displayed his extraordinary skill in the Grecian and Roman architecture; and has introduced all the five orders together.

(65.) In the 15th and 16th centuries, when learning of all kinds began to revive, the chaste architecture of the Greeks and Romans seemed, as it were, to be recalled into life. The first imitations of it began in Italy, and even owed their existence to the many ruins of the ancient Roman structures that were to be found in that country, from whence an improved method of building was gradually brought into the other countries of Europe: and though the Italians for a long time retained the superiority, as architects, over the other European nations, yet as men of genius from all quarters constantly visited Italy, for the purpose of improvement in architecture, as well as the other arts, since that period they have been equalled, if not surpassed, by architects of other nations, and even of our own country. Of this we had a recent instance in our countryman Mr MYLNE, who gained the prize in architecture at Rome, where, we need not doubt, he had the best Italian artists of the age to compete with.

PART I.

GENERAL PRINCIPLES OF ARCHITECTURE.

SECT. I. Of COMPOSITION and HARMONY in BUILDING.

(66.) The original intention of architecture being protection from the inclemency of the weather, and this being easily attained by simple and coarse materials, carelessly compiled together, a considerable period must doubtless have elapsed before other objects were thought of, as proper or necessary to be conjoined with it. The depredations of winds and rains, however, would soon teach the necessity of strength and solidity; the failures of repeated attempts to guard against them, would show that proportion and some degree of order were absolutely necessary; but antediluvian ages in all probability would pass, before beauty, regularity, harmony, and grandeur were superadded to convenience and utility; and consequently before architecture came to be considered as a fine art.

(67.) The experience of mankind, however has long taught us, that architecture, though still chiefly valuable on account of its utility, is capable, as well as other arts and sciences, of exciting a variety

a variety of agreeable sensations, when in the execution of it, order, proportion, regularity, grandeur and ornament, are duely attended to. But as all these objects are not equally or uniformly requisite in all buildings, we must distinguish buildings and parts of buildings into three different kinds; viz. 1. such as are intended solely for utility; 2. such as are designed solely for ornament; and 3. such as are meant to comprehend both.

(68.) Buildings, intended solely for utility, ought in every part to correspond with that design. Any material deviation from usefulness for the sake of ornament ought to be strictly avoided. Works of entire usefulness are considered as a mean to some end, and the nearer they approach to a perfect mean for obtaining that end, the more will such structures gain our applause, though every beauty of ornament be neglected. On the other hand, in works merely calculated for ornament, such as columns, obelisks, triumphal arches, &c. beauty alone ought to be regarded. The principal difficulty in architecture lies in combining usefulness and ornament. The most practicable method is to prefer utility to ornament, in proportion as the character of the building requires it. In palaces and large buildings which admit of a variety of useful contrivance, regularity ought to be preferred; but in dwelling houses that are on too small a scale for variety of contrivance, regularity should give place to usefulness, so far at least as the former is inconsistent with the latter.

(69.) In considering attentively the beauty of visible objects, we discover two kinds. The first may be termed *INTRINSIC* beauty, because it is discovered in a single object, without relation to another. The second may be termed *RELATIVE* beauty, being founded on a combination of relative objects. Architecture admits of both kinds.

(70.) There is a sort of beauty or harmony in the whole character of a building, with relation to its intended occupier, which is necessary to be added to. Vitruvius, Palladio, and other ancient writers, have been careful to inculcate this doctrine. The appearance of a palace ought to convey an idea of the majesty and grandeur of the monarch, so that a common observer may pronounce, on the first view of such an edifice, that it is destined to be the habitation of so dignified a personage. Nature affords a precedent for this doctrine. The vaulted canopy of the heavens, and all their richly ornamented spheres, constitute a glorious temple that bespeaks the character of its divine architect and proprietor. The like conformity should appear in temples, and in those inferior structures erected by art for the accommodation of the various classes of human society. Palladio remarks that, if an architect is employed to build a house for any public officer of the nation, such as an ambassador, or prime minister, &c. he should introduce porticoes, galleries, and magnificent halls, richly adorned, in order that such as attend on business, or visit the possessor, may be agreeably entertained and amused while they wait.

(71.) In all cases, regard is to be paid to the dignity, rank, and profession of the occupier, rather than to his wealth. But if a building is destined for some particular purpose of a public nature, we should regard the public use for which

it is intended, without confining our ideas to the quality of any individual proprietor. A play-house should have a gay and splendid style, but that of a church should be not only grave and solemn, but also bold and magnificent, affording a proper quantity and equal distribution of light to every part occupied in the time of worship. The appearance and style of a monument ought to be solemn and gloomy, so ornamented as to awaken the memory of the deceased in the minds of surviving friends. Courts of justice, senate-houses, or the like, have also their proper style, which will always be observed by good architects.

(72.) Artists who deal in the beautiful, love to entertain the eye; palaces and sumptuous buildings, in which intrinsic beauty may be fully displayed, give them an opportunity of exerting their taste. But such a propensity is peculiarly unhappy with regard to private dwelling houses; because, in these, relative beauty cannot be displayed to perfection without hurting intrinsic beauty. There is no opportunity for great variety of form in a small house; and in edifices of this kind, internal convenience has not hitherto been happily adjusted to external regularity. Perhaps an accurate coincidence in this respect is beyond the reach of art. Architects, however, constantly split upon this rock; for they never can be persuaded to give over attempting to reconcile these two incompatibles: how otherwise should it happen, that of the endless variety of private dwelling-houses, there should not be one found, that is generally agreed upon as a good pattern? The unwearied propensity, to make a house regular as well as convenient, obliges the architect, in some articles, to sacrifice convenience to regularity; and, in others, regularity to convenience; and accordingly the house which turns out neither regular nor convenient, never fails to displease.

(73.) Nothing can be more evident, than that the form of a dwelling-house ought to be suited to the climate; yet no error is more common than to copy in Britain the form of Italian houses, not forgetting even those parts that are purposely contrived for collecting air, and for excluding the sun; witness our colonnades and logios, designed by the Italians to gather cool air, and exclude the beams of the sun, conveniences which the climate of this country does not require.

SECT. II. *Of the BEAUTY arising from PROPORTION.*

(74.) The proportions of a door are determined by the use to which it is destined. The door of a dwelling-house, which ought to correspond to the human size, is confined to 7 or 8 feet in height, and 3 or 4 in breadth. The proportions assigned to a stable or coach-house, are different. The door of a church ought to be wide, to afford an easy passage to a multitude; and its height should therefore be in proportion, that its appearance may please the eye. The size of windows ought always to be in proportion to the dimensions of the room they are intended to illuminate; for if the apertures, or openings, be not large enough to convey light in an equal distribution to every part of the room, the whole will have a defective

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ferent quantities that pleases the eye, without the least relation to sound.

(82.) With regard to the FIGURE of rooms little need be said, as it is self-evident that those of four sides with right angles, are best adapted for the reception of light, and the distribution of furniture. Those, however, of the circular or regular polygonal kind are preferable, when the light comes in by an aperture in the roof or ceiling.

SECT. III. *Of the EXTERNAL PROPORTIONS of HOUSES.*

(81.) An ingenious author on this subject has the following remark: "To see, on a considerable eminence, the length of a front trifling, and the height disproportioned, would be as absurd as to behold a front in a vale long and extended, and elevated only one storey. Proportion (says he) requires our nicest choice, which must be dependent upon rules; for as the jarring of instruments by blind chance cannot possibly please the ear, so the disproportion of the parts of any object must naturally shock the eye; and in both, unerring rules must so proportion the sounds, and dispose the parts, as the whole may be in complete harmony. Nature has taught mankind, in music, certain rules for proportions of sounds; so architecture has its rules dependent on those proportions, or at least such proportions as are in arithmetical harmony; and those we take to be dependent on nature. The square in geometry, the unison or circle in music, and the cube in building, have all an inseparable proportion, the parts being equal, and the sides and angles, &c. give the eye and ear harmonic pleasure."

(83.) Yet even this theory, when applied to the whole fabric, gives way to exceptions; for the cube must not exceed 50 feet; the cube and half 60 feet; and the double cube 80 feet front. The general rule is as follows: If the cube be 50 feet front, the depth and height will be the same. The cube and half is when the front is 60 feet long; the depth and height each 40 feet. The double cube of 60 feet will be 30 feet deep and 30 feet high. In the country where gentlemen's houses are detached, and are easily viewed in front and depth by an approaching traveller, a strict regard to proportion becomes necessary; for if the cube form be adopted in very large houses, it will appear uncouth and heavy; whilst, on the other hand, it is equally disagreeable to see a dwelling house approach to the appearance of a lofty tower.

(84.) Very high dwelling houses prove exceedingly inconvenient; and therefore, where beauty of proportion is connected with utility, they ought rather to assume the figure of a parallelopipedon resting on its larger base. Hence that form of building which rather spreads upon the ground than rises in height, is always preferred. In towns the houses being generally attached to each other, they unitedly compose a regular street or square; in which case, the proportions of an individual front are less obvious, and their depth in this respect immaterial. The great object of concern is the uniformity of the whole, when compared; or of one individual house with the whole. In these situations, the proportions of houses, and

the length and extent of streets, are rather subject to acts of parliament than to architectural laws.

(85.) There are four different rates into which the proportions of houses in town are divided or classed by the legislature. The first rate or houses of the largest size, are such as exceed nine squares of building; those of the second rate are from 5 to 9 squares; those of the 3d from three and a half to 5 squares; and of the 4th not exceeding 3 squares and an half. Their height is regulated in like manner, and the thickness of their walls and chimneys. Under such restrictions the architect must often proceed under great disadvantages, and must occasionally call forth the good quality of docility recommended by Vitruvius.

SECT. IV. *Of the SITUATION and INTERNAL DIVISION of HOUSES.*

(86.) A proper situation for building, where a choice can be had, is highly worthy of the attention of an architect. It must be obvious that a rising ground is much better suited for a magnificent palace than a concealed valley; and that it would be incongruous and absurd to erect a sumptuous building on a wild, uncultivated, and barren ground, destitute of water, woods, hills, or other natural beauties, which nature has assigned to various and even extensive portions of the earth. Where such situations are left to the choice of the architect, it becomes him to apply his taste in fixing the precise situation or bearings of his intended work, in the execution of which he must attend to the four cardinal points.

(87.) In the first place he must observe, that every internal division or room may receive a due degree of light and heat, suited to its intended use, and the different seasons in which it is more particularly to be occupied. Here the skilful architect must exercise several of those qualifications enumerated by Vitruvius, as essentially requisite to the formation of his character. And indeed whatever qualifications are absolutely necessary in the proper choice of the situation and plan of a town or city, the same will be wanted to complete a country residence.

(88.) The chief objects of human concern being health, pleasure, and convenience, whatever contribute to these must be studied with attention. Hence the necessity of a situation best adapted for good air, a sufficient supply of wholesome water at a convenient distance for family use and fertile grounds, whose produce in summer may render salubrious the element in which we breathe. For the same reasons, marshy, low, and barren lands, (where even brutes will scarcely thrive) and more especially stagnant waters should be avoided.

(89.) One infallible mark of a good situation for health, is thriving cattle, and healthy inhabitants. In fixing on the precise spot of ground, that which is moderately elevated, if it be contiguous to some river, will be best adapted for health, pleasure, and convenience. In such a situation, the air has a constant motion and free circulation, by which it purifies itself, as water does by a current, and becomes more salutary to the human frame. And nothing can so much contribute to the excellence of a prospect as a river,

especially a winding one; the beauty of which will, in idea, be heightened by its utility as the means of supplying water for family use.

(90.) These essential preliminaries being settled, the architect proceeds to consider in what direction his front and flank are to be placed with respect to the south or north points. This, in many instances, will be closely connected with the internal division of the house, which assigns to each room its particular use and season. Cool drawing-rooms are suitable for summer; and for this purpose they should be large, and situated toward the north, or so as to be screened from the scorching beams of the sun. Warm drawing-rooms are adapted for winter; and therefore these should be small, and have a place towards the south, or where the reviving rays of the sun have free intercourse. Rooms appropriated for spring and autumn may be in a medium situation to these, and should have their windows to look into the different gardens or green walks. Libraries, studies, and morning rooms, should have the same sort of prospect, as being most conformable to morning exercises. If the house be built on so large and magnificent a scale, as to admit the same variety in all the different apartments, the dining parlours, bed-rooms, &c. will be subject to the same laws of situation, and answerable to the different seasons of the year.

(91.) It has been doubted whether the principal rooms should lie nearest the grand entrance, as being best suited to give them their full effect. The following reasons have been urged for the negative. A large and spacious room, which is generally the first that receives us, is a bad contrivance in several respects. 1. When, immediately from the open air, we step into such a room, its size is apparently diminished by contrast; and looks little, compared with the great canopy of the sky. 2. When it recovers its grandeur, as it soon does, it gives a diminutive appearance to the rest of the house; passing from it, every apartment looks little. 3. By its situation it serves only for a waiting room, and a passage to the principal apartments. Rejecting therefore this form, a hint may be taken, from the *climax* in writing, for another that appears more suitable: a handsome portico, proportioned to the size and fashion of the front, leads into a waiting room of a larger size, and this to the great room, all by a progression of from small to great.

(92.) The different offices should be so arranged as to appear to compose an inferior part of the whole building, not totally detached, yet in such order as to keep the more offensive ones as remote as possible from the principal parts of the house. This indeed is the arrangement of nature; for if we compare the several parts of a building to the various members which compose an animal frame, we see that the most beautiful parts are the most conspicuous, whilst those that are less comely are concealed.

SECT. V. Of the VARIOUS ORNAMENTS, which contribute to give a PECULIAR EXPRESSION, or an APPARENT USEFULNESS to BUILDINGS.

Some writers on architecture have doubted whether a building can admit of any ornaments

but such as are useful, or at least have the appearance of being so. But considering architecture no less as a fine than an useful art, both kinds may be properly introduced. A private house, and other edifices, where use is the chief aim, admit not indeed of any ornaments but such as have the appearance of utility. But temples, triumphal arches, and such buildings as are chiefly intended for show, may be highly ornamented without any regard to their seeming usefulness. Hence a three-fold division of ornaments has been suggested, viz.

(94.) 1st, Ornaments that are beautiful without relation to use; such as statues, vases, &c.—2d, Objects in themselves not beautiful, but possessing the beauty of utility, by imposing on the spectator, and appearing to be useful; such as blind windows. 3d, Where things are beautiful in themselves, and at the same time assume the appearance of use; such as pilasters. With regard to the first, a statue should be so placed, that it may be seen in every direction, and at various distances, either in receding or advancing. Statues ought not to be placed in the niches of fronts of houses, or on the tops of walls and roofs.—Their proper places are in large halls, and in passages that lead to a grand stair case, &c. To adorn the top of the wall with vases, is an absurd conceit, by placing a thing, whose natural destination is utility, where it cannot have even the least appearance of it. Firmness and solidity being the proper expressions of a pedestal, and, on the contrary, lightness and delicacy of carved work, the pedestal, whether of a column or of a statue, ought to be sparingly ornamented. The ancients never ventured on any bolder ornament than the basso relievo.

(95.) As for ornaments of the 2d kind, it is a great blunder to contrive them so as to make them appear useless. A blind window, therefore, when necessary for regularity, ought to be so disguised as to appear a real window: when it appears without disguise, it is disgusting, as a vain attempt to supply the want of invention; it shows the irregularity in a stronger light, by signifying that a window ought to be there in point of regularity, but that the architect had not skill sufficient to connect external regularity with internal convenience.

(96.) With regard to the 3d species of ornaments, it is an error to sink pilasters so far into the wall, as to remove totally, or mostly the appearance of use. They should always project so much from the wall, as to have the appearance of supporting the entablature over them.

(97.) Of all the ornaments in great buildings, pillars are the chief. The destination of a pillar is to support, either in appearance or reality, the entablature. With regard to the form of a pillar, it must be observed, that a circle is a more agreeable figure than a square, a globe than a cube, and a cylinder than a parallelopipedon.—This last, in the language of architecture, is saying, that a column is a more agreeable figure than a pilaster; and for that reason it ought to be preferred, when all other circumstances are equal. Another reason concurs, that a column annexed to a wall, which is a plain surface, makes a greater variety than a pilaster. Besides, pilasters at a distance

distance are apt to be mistaken for pillars; and the spectator is disappointed when, on a nearer approach, he discovers them to be only pilasters.

(98.) It is a question, among architects, whether any new order can be added to the Doric, Ionic, and the Corinthian. Some hold the affirmative, and give for instances the Tuscan and Composite; others maintain, that these properly are not distinct orders, but only the original orders, with some slight variations. The only circumstances that can serve to distinguish one order from another, are the form of the column, and its destination. To make the first a distinguishing mark, without regard to the other, would multiply orders without end. Destination is more limited, and it leads us to distinguish three kinds of orders; one plain and strong, for the purpose of supporting plain and massy buildings; one delicate and graceful, for supporting buildings of the opposite character; and between these a 3d, for supporting buildings of a mixed nature. So that, if destination alone is to be regarded, the Tuscan is of the same order with the Doric, and the Composite with the Corinthian.

(99.) The ornaments of these three orders ought to be suited to the purposes for which they are intended. Plain and rustic ornaments would not be a little discord with the elegance of the Corinthian order, and sweet and delicate ornaments not consistent with the strength of the Doric.

(100.) There are two general rules with respect to buildings of every kind. One rule, dictated by utility, is, that they be firm and stable. Another, dictated by beauty, is, that they also appear so to the eye: for every thing that appears tottering, and in hazard of tumbling down, produces in the spectator the painful emotion of fear, instead of the pleasing emotion of beauty; and accordingly it should be the great care of the artist, that every part of his edifice not only be well supported, but likewise appear to be so. Some have introduced a conceit in architecture, by giving parts of buildings the appearance of falling; of this kind is the church of St Sophia in Constantinople: the round towers in the uppermost storeys of Gothic buildings are in the same false taste.

(101.) The most considerable ornaments used in architecture are the five orders of columns, pediments, arches, balusters, &c. which we shall now proceed to describe.

PART II.

OF THE FIVE ORDERS OF ARCHITECTURE.

SECT. I. Of the SEVERAL PARTS and MEMBERS of an ENTIRE ORDER.

(102.) The principal parts of an entire order are three; the pedestal, shaft, and entablature.— Each of these are again subdivided into three smaller parts: The pedestal contains the plinth, (see Tuscan order, Pl. X.) the dado, and the cornice. The column includes the base, the shaft, and the capital. The entablature consists of an architrave, frieze, and a cornice. The names require illustration.

(103.) 1. The PLINTH takes its appellation from

πλατὺς, a brick or flat square stone on which columns in the most early state of architecture are supposed to have stood. 2. The DADO, or DYE, is so called because it is of a cubic form. 3. The CORNICE is derived from *coronis*, a top or summit; because the cornice is the extreme end or finishing of the pedestal. 4. The BASE of the column is from *βασίς*, a foundation or footing for the column. 5. The SHAFT, that long and straight part of a column comprehended between the base and capital, is so named from *σκαπίζω* to dig, in the manner of a well, round and deep, whose inside resembles the shape of a pillar. 6. The CAPITAL, from *κεφαλή*, or *caput*, the head, which the capital is to a column. 7. The ARCHITRAVE, from *αρχή* chief or principal, and *trabs* a beam, because the architrave is the chief support to the whole entablature. 8. The FRIEZE is so called from *φρίξω* a border or fringe, which some of the ancients used to call *ζωφωρεῖς*; because their friezes were usually enriched with the figures of animals. 9. The CORNICE of the entablature, or the crowning part of the entire order is explained above.

(104.) These nine principal parts of a complete order, the dado and shaft excepted, are composed of small members, which constitute all that simple and pleasing variety of mouldings which adorned the works of the ancients. The names of these mouldings allude to their forms, and their forms are adapted to the purposes for which they were intended. See Plate XX. fig. 1, 2, 3, 4, 5, 6, 7, 8.

(105.) The names of the members, with their origin and use, are as follows. The figures refer to the parts numbered in the Doric Order, Pl. X.

Fig. 1. The FILLET, from the French word *fil*, thread.

2. The CYMATIUM, or *cyma recta*, from *κύμα*, a wave; because this member resembles the swelling and concavity of a wave.

3. The CYMA REVERSA, the preceding member inverted.

4. The CORONA, or crown, because it is the principal member of the cornice, and serves as a shelter to the smaller mouldings of the entablature.

5. The OVOLO, from *ovum* an egg; because this member by the ancients was frequently carved in the form of an egg.

6. The CAVETTO, from *cavus*, hollow.

7. The CAPITAL, or upper fillet of the triglyph.

8. The TRIGLYPH, from *τριγλυφός*, three engravings, compounded of *τρι*, three, and *γλυφω*, to carve or engrave; in conformity to which, the triglyph has two entire channels and two half ones, with three spaces between.

9. The METOPE, from *μετόπη*, the space between one aperture or hole to another; the triglyphs being supposed to be joints that fill the apertures: hence the space between the triglyphs, which forms an exact square, is termed the metope.

10. The FRIEZE is explained above, § 103.

11. The BAND is the same as the fillet.

12. The GUTTÆ, or the DROPS, are of a conic figure.

13. The ARCHITRAVE. See the explanation, § 103.

14. The FACIA, or face; of these there are two in the architrave.

15. The ABACUS, from *αβάξ*, a shelf or table:

or, as some suppose, a title, on which the ancient Greek mathematicians strewed dust, to draw their geometrical schemes on. The word seems to have been introduced into architecture on the invention of the Corinthian capital, which took its rise from an acanthus growing round a basket. See **ABACUS**. See also **PLATE XX**.

16. The **OVOLO** of the capital, which in this situation must be considered as the basket round which the acanthus grew.

17. The **ANNULETS**; so called because these small fillets encompass the capital, like rings joined to each other. The moderns, in place of these, generally have a small cavetto.

18. The **COLORINO**, the collar, or neck of the capital.

19. The **ASTRAGAL**, from *αστράγαλος*, a bone of the heel; or the curvature of the heel, which this member resembles. The hollow which follows is termed *εσκαπή*, the **ESCAPE**, because this part of the column appears to fly off.

20 and 22. The upper and lower **TORUS**, from *τορὸς*, a cable, which this moulding somewhat resembles.

21. The **SCOTIA**, from *σκοτία*, darkness; because of the strong shadow which its concavity produces, and which is increased by the projecting torus above.

(106.) In some of the Doric entablatures, (see **Pl. XXI**.) are **MOTULES**, from *mutuli*, modillions, which are placed perpendicularly over each triglyph, and are of the same width; and whose projection in the corona is the same, forming a perfect square. In others are **DENTILS**, as in the theatre of Marcellus at Rome. These are so named from *dentes*, teeth, which they resemble; and the flat member on which these dentils are placed is termed *denticulus*. The capitals of the Ionic, Corinthian, and Composite, (see **Plate X**.) have each of them **VOLUTES**, so called from *volutum*, to roll round, as on a staff. Some call the volutes the **HORNS** of the capital, because they resemble the twisting of ram's horns.

(107.) Those parts of the different orders which are termed **MOULDINGS** are only 8 in number. (See **Pl. XX**.) viz. The fillet or cincture to bind the parts. The astragal also and torus, resembling ropes or cables, are strong binders and fortifiers of the parts with which they are connected. The ovolo is strong at its extremities, and is therefore fit to support projecting parts. The cyma recta, inveria, and cavetto, are covering mouldings, which serve to shelter the other smaller members. There are various methods of describing the contours of these; but the simplest, and perhaps the best, is to form them of quadrants of circles, as is shewn in the plate.

(108.) An assemblage of what are called essential parts and mouldings is termed a **PROFILE**. The most perfect profiles are such as are composed of few mouldings, varied in form and size; and so disposed, that the straight and curved ones succeed each other alternately. When ornaments are employed in mouldings, some of them should be left plain, in order to give a proper repose: for when all are ornamented, the figure of the profile is lost.

SECT. II. Of the DIMINUTION of COLUMNS.

(109.) The ancients, in effecting the diminution of the shaft of a column, adopted a variety of methods; beginning sometimes from the foot of the shaft, and at others from one quarter, or one third of its height; the lower part being perfectly cylindrical. The former of these was most in use amongst the ancients, and, being the most natural and graceful, ought to have the preference, though the latter has been more universally practised by modern artists.

(110.) **M. AUZOUT** is of opinion, that the first architects probably made their columns in straight lines, in imitation of trees; so that their shaft was a frustum of a cone: but finding this form abrupt and disagreeable, they made use of some curve, which, springing from the extremities of the superior and inferior diameters of the column, swelled beyond the sides of the cone, and by that means gave a more pleasing figure to the contour.

(111.) **VITRUVIUS** mentions this practice, but in so obscure and cursory a manner, that his meaning has not been understood; and several of the modern architects, intending to conform themselves to his doctrine, have made the diameters of their columns greater in the middle than at the foot of the shaft.

(112.) **LEON BAPTISTA**, **Alberti**, and others of the Florentine and Roman architects, have carried this to a very great excess; for which they have been justly blamed, as it is neither natural, reasonable, nor beautiful. **M. Auzout** observes that a column, supposing its shafts to be the frustum of a cone, may have an additional thickness in the middle, without being swelled there beyond the bulk of its inferior parts; and supposes the addition mentioned by **Vitruvius** to signify nothing but the increase towards the middle of the column, occasioned by changing the straight line, which at first was in use, for a curve.

(113.) This supposition is extremely just, and founded on what is observed in the works of antiquity; where there is no instance of columns thicker in the middle than at the bottom, though all have the swelling hinted at by **Vitruvius**, all of them being terminated by curves; some granite columns excepted, which are bounded by straight lines; a proof, perhaps, of their antiquity, or of their having been wrought in the quarries of Egypt by bungling and unskilful workmen.

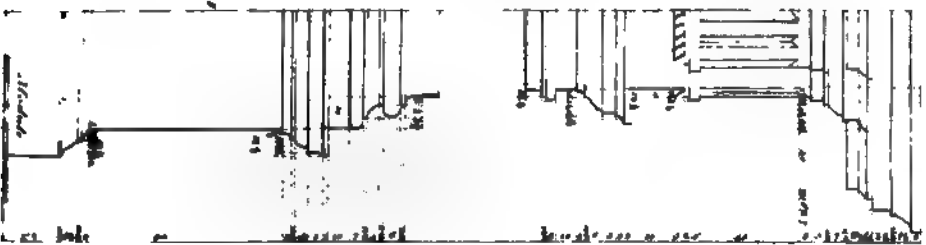
(114.) **M. BLONDEL**, in his work intitled *Régle pour la construction des quatre principaux Ordres d'Architecture*, teaches various manners of diminishing columns; the best and simplest of which is by means of the instrument which **Nicomedes** invented to describe the first conchoid: for this, being applied at the bottom of the shaft, performs at one sweep both the swelling and the diminution; giving such a graceful form to the column, that it is universally allowed to be the most perfect practice hitherto discovered. The columns in the Pantheon, accounted the most beautiful among the antiques, are made in this manner; as appears by the exact measures of one of them to be found in **Dezobry's** *Antiquities of Rome*.

(115.) To give an accurate idea of the operation,

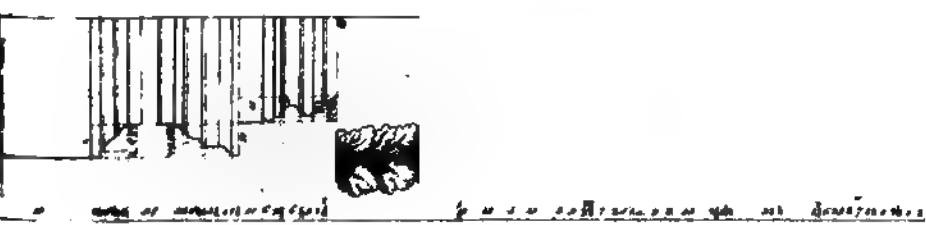
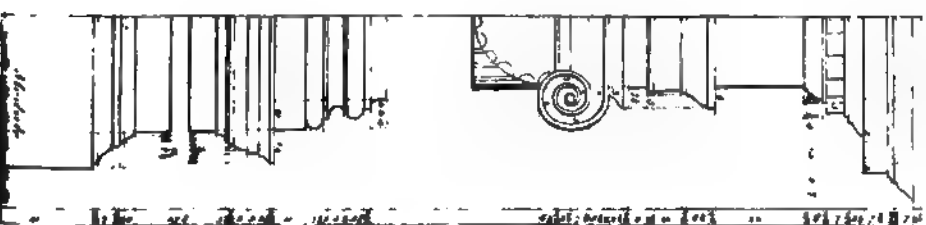
Thorum.



Door.

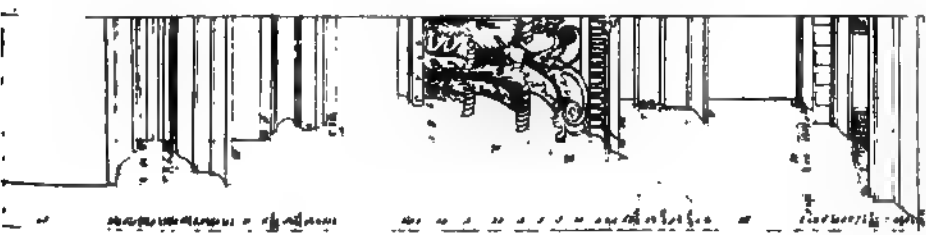


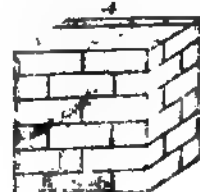
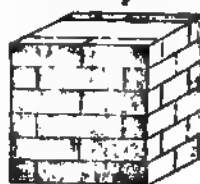
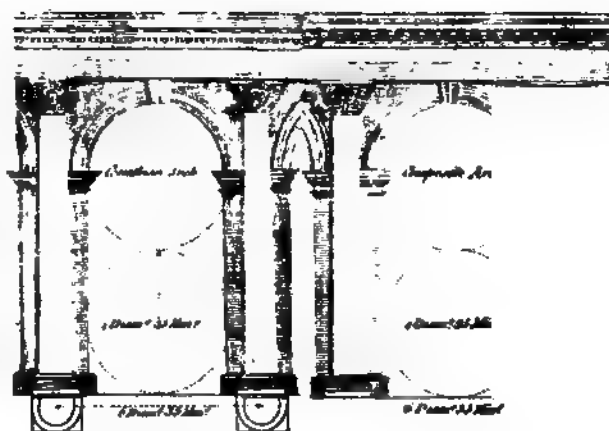
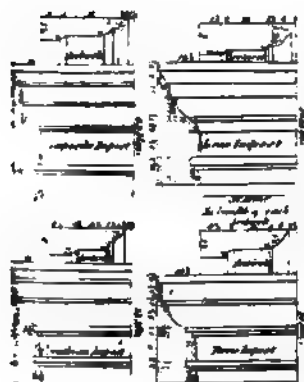
ARCHITECTURE
Door.



Verandah

PLA



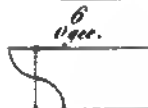
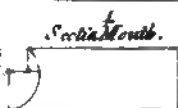
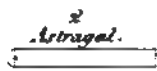




ARCHITECTURE

Ancient Halls.

PLATE II.



Saxon Capitals



Torus



Origin of the Corinthian Capital

Corinthian



Saxon Capital



Modillion

Coffin & Rose



Designs for Gates and Piers.



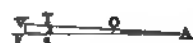
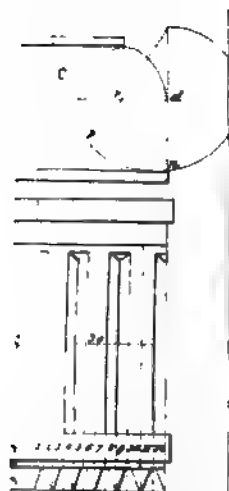
Designed for the King's College, Cambridge.

ARCHITECTURE.

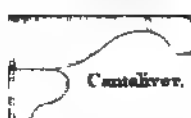
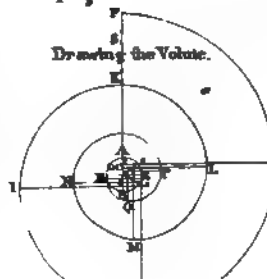
Possion.

Caryatide.

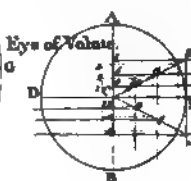
Terminus.



Drawing the Volute.



Constructing.



Eyes of Volute.

by some will more nearly answer to the different parts of the column.

SECT. IV. *Of the INTERCOLUMNIATION of the ORDERS.*

(121.) Columns are either engaged or insulated; and when insulated or detached from the wall, they are either very near, or at a considerable distance from it. When they are placed at a considerable distance from the wall, they are destined to support the entablature; and their distance from each other should be consistent both with their real and apparent solidity. Engaged columns are attached to the wall, and are not limited in their intercolumniations, as they depend on the breadth of the arches, doors, windows, niches, or other decorations placed in them.

(122.) The ancients used five different species of intercolumniations, which, according to Vitruvius and Palladio, are as follows:

I. The **PYCNOSTYLE**, of which the interval or space is one and a half of the inferior diameter of the column.

II. The **SYSTYLE**, whose interval is two diameters.

III. The **EUSTYLE**, two diameters and a quarter.

IV. The **DIASTYLE**, three diameters—and

V. The **ARÆOSTYLE**, four diameters.

(123.) The three first of these were used by the Grecians, in the Doric, Ionic, and Corinthian orders; but the distances of the triglyphs of the Doric determined the intercolumniations of that order, which we shall describe in its place.

(124.) The ancient Romans preferred the **EUSTYLE** in most cases, as the best medium of the too little and too great intervals of columns; but in their Tuscan works, they used a space equal to four and sometimes six diameters, which intercolumniations was admissible in this order, since the architrave was usually formed of some kind of timber, when the other parts of the entablature were of stone. Palladio says, this intercolumniation of the Tuscan order was adapted to farm houses and other rustic works, as it afforded a passage for carts, and was attended with the least expence. In structures built entirely of stone; however, they used a shorter interval, more suitable to the length of their marble blocks, and more agreeable to the ponderous fabric which they occasionally supported; for which reason the diastyle and eustyle modes were sometimes applied to this order.

(125.) The moderns have indeed adopted these two as their general rule, and apply them to every order except the Doric. The aræostyle, however, is sometimes, by a modern contrivance, authorised by a few examples of the ancients, introduced in porticoes and peristyles. This mode of the aræostyle is from Perrault, and is managed by placing 2 columns together at the angles, so close as to admit the two capitals nearly into contact. This manner, which is termed grouping, takes off from the excessive width of this kind of interval, whilst it adds to it both real and apparent strength, as is exemplified in St — church in London, and in the palace of the Paris.

SECT. V. *Of ARCHES and their ORNAMENTS.*

(126.) Arches are not so magnificent as colonnades; but they are more solid and less expensive. They are proper for triumphal entrances, gates of cities, of palaces, of gardens, and of parks, and, in general, for all openings that require an extraordinary breadth. There are various manners of adorning arches. Sometimes their piers are rusticated; sometimes they are adorned with pilasters, termini, or caryatides; and sometimes they are made sufficiently broad to admit niches or windows.

(127.) The circular part of the arch is either surrounded with rustic key stones, or with an archivolt enriched with mouldings; which, in the middle, is sometimes interrupted by a console, or mask, serving at the same time as a key to the arch, and as a support to the architrave of the order. The archivolt is sometimes supported by an impost, at the head of the pier; and at others by columns placed on each side of it, with a regular entablature, or architrave and cornice.

(128.) There are likewise instances of arcades without piers, the arches being turned on single columns, as in the temple of Faunus at Rome, &c. But this practice ought not to be imitated, as it is neither solid nor handsome. When arcades, however, are employed to ornament domestic apartments, the breadth of the pier need not exceed one quarter of the opening of the arch.

(129.) When arches are closed up, to receive doors, windows, or niches, the recess should be sufficient to contain all the projections of what is placed therein, otherwise their appearance is clumsy, and will become too principal, which produces a bad effect in the composition. When arches are large, the key stone should never be seated, but cut in the form of a console, and carried close under the soffit of the architrave, which, on account of its extraordinary length, requires a support in the middle. The imposts of arches should never be omitted; at least, if they be, a platform ought to supply their place. If columns are employed without pedestals in arcades, they should always be raised on a plinth.

(130.) In arches of great magnitude, the circular part ought not to spring immediately from the impost, but take its rise at such a distance above it as is necessary in order to have the whole curve seen at the proper point of view. The void or aperture of arches should never be higher, nor much lower, than double their breadth; the breadth of the pier should seldom exceed two thirds, nor be less than one third of the breadth of the arch; and the angular pier ought to be broader than the others, by one half, one third, or one fourth: the impost should not be more than one seventh, nor less than one ninth of the aperture; and the archivolt must not be more than one eighth, nor less than one tenth of it. The breadth of the console must, at the bottom, be equal to that of the archivolt; and its sides must be drawn from the centre of the arch: the length of it must not be less than one and a half of its smallest breadth, nor more than double. The thickness of the pier depends on the breadth of

the portico; for it must be strong enough to resist the pressure of its vault. But with regard to the beauty of the building, it should not be less than one quarter of the breadth of the arch, nor more than one third. These are the general dimensions of arches.

(131.) The proportions peculiar to the Tuscan arch, of which we have given an example, without pedestals, are as follows: In height, their aperture is 7 diameters and a quarter, in width 4, and from centre to centre of the columns, 6 diameters. According to the preceding remarks, the archivolt and impost are half a diameter, and from the top of the archivolt to the underside of the architrave should not be less than 15 minutes. The breadth of the key stone at the bottom is equal to its archivolt; and its spreading sides are determined by lines drawn from the centre of the arch, as is shewn in the plate. The plinth is one diameter in height, and the proportions of the column and entablature are the same with the Tuscan profile, PLATE XVIII. For the proportions of the moulding of the archivolt and impost, see PLATE XIX.

(132.) The Tuscan arch with pedestals is in width $4\frac{1}{2}$, and in height 8 diameters, and a quarter; and from centre to centre of each pier is $6\frac{1}{4}$. In every other particular they are subject to the preceding rules.

SECT. VI. Of the ORIGIN, CHARACTER, USE, and PROPORTIONS of the DORIC ORDER.

(133.) The DORIC order derived its name from the Dorians, a nation of ancient Achaia, from whom it doubtless received the proportions and derived most of the parts by which it has been distinguished from orders of later date. The Doric, as to its character, is by architects considered grave, robust, and of masculine aspect: hence figuratively termed the *Herculean* order. The ancients accordingly used it in their temples dedicated to Juno, Minerva, Mars, and Hercules, whose grave and heroic dispositions suited well the stately character of this order.

(134.) This order may be properly used in colonnades, porticoes, halls, gates of cities, and public buildings erected in memory of heroes, or famous personages. In most of the antiques, the Doric column is executed without a base. Vitruvius makes it without one; the base, according to him, having been first employed in the Ionic order, in imitation of the sandals worn on women's feet. Scamozzi blames this practice, and most of the moderns are of his way of thinking.

(135.) The remarks of LE CLERC, in opposition to De Chambre, are worthy of notice. The latter asserts, that the Doric column is after the model of a strong man, who is constantly represented bare footed. He also observes, that the base of a column is the same as a shoe to a man, and therefore censures the use of a base as improper and unchaste. Le Clerc admits, that the most ancient Dorics were destitute of bases, though he considers it difficult to assign any good reason for it. "But I must own, (says he) I cannot consider a column without a base, in comparing it to a man, but I am at the same time struck with the idea of a person without feet rather than shoes:

for which reason I am inclinable to believe, either that the architects of antiquity had not yet thought of employing bases to their columns, or that they omitted them in order to have the pavement clear; the angles and projections of bases being stumbling blocks to passengers, and so much the more troublesome, as the architects of those times frequently placed their columns very near each other: so that had they been made with bases, the passages between them would have been extremely narrow and inconvenient; and it was doubtless for the same reason that Vitruvius made the plinths of his Tuscan column round; that order, according to his construction, being particularly adapted to servile and commercial purposes, where convenience is preferable to beauty. However this be, persons of good taste will grant, that a base not only gives a graceful turn to the column, but is likewise of real use, serving to keep it firm on its plan; and that if columns without bases are now set aside, it is a mark of the wisdom of our architects, rather than an indication of their being governed by prejudice, as some adorers of antiquity would insinuate."

(136.) In conformity to the arguments of this celebrated author, and agreeably to the practice of Palladio and of our modern architects, we have introduced an attic base to this order; yet, in ornamental temples, for gardens, &c. we are decidedly of opinion, that the Grecian style should be copied strictly and preserved chaste, according to the remains of antiquity, as discovered by both ancient and modern architects, who have with great diligence and expence explored their ruinous piles, to obtain accurate measurements of the several parts; particularly our countryman JAMES STUART, Esq. who, in three folio volumes, has presented to public view the antiquities of Athens, in which we have a clear display of pure Grecian architecture. In these we see, as well as in other works, that the Doric column was without a base, but its shaft decorated with a number of channelings or flutings peculiar to itself: for in the other orders, an interval or fillet is introduced between each fluting, but in this it is otherwise. Hence Scamozzi's censure of this manner of fluting is imperfect, in consequence of the projecting angles which separate each flute, which renders the shaft tender and more subject to decay. The force of this objection however will be greatly abated, when it is considered, that these flutings are shallow, having their centre from the summit of an equilateral triangle, whose sides are equal to the width of the flute; consequently, it is little more than one quarter of the depth of the other kinds of fluting which are perfect semicircles. It is also to be observed, that the Grecian temples were composed of hard stone or marble, not subject to decay, and preserved from outward violence by a religious or rather a superstitious care: and without some sort of care, even the angles of the Ionic or Corinthian fluting will become an easy prey to the injuries of outward violence.

(137.) The other members which mark the peculiar feature of this order are the triglyph and mutule. The mutules are considered as a memorial or imitation of the primitive huts (see PLATE XX. Fig. 2 & 3,) whose beams are seen to project

outwardly under the roof; but the triglyph is thought by some to be emblematical of the use of the first temple erected according to this order, which was dedicated to Apollo, to whose harp the triglyph bears some sort of resemblance. The *metope*, or spaces between the triglyphs, have been variously enriched. Palladio introduced ox's skulls, with lighted torches hanging from each horn, and placed alternately with pateras, expressive of the sacrificial offerings performed to the heathen deities.

(138.) Various other ornaments may, however, be introduced with propriety, both in public and private buildings. In the latter, crests, and badges of dignity, heads, vases, or pateras, encircled with garlands of oak or laurel, are very suitable; in military structures, heads of Mars, Medusa, or the Furies; may be admitted. But some architects object to the introduction of swords, spears, or the like weapons, as being of too large dimensions for such small compartments, and which, to represent in miniature, would be too trifling, and inconsistent with the dignity of such works. When this order is employed in churches and other religious edifices, the metope may have cherubs, chalices, doves, garlands of palm and olive, and other devices, emblematical of moral virtues: but the most elevated parts of all these should project little more than the triglyph. This rule was strictly observed by the ancients, who seldom gave their ornaments more projection than that of the borders in which they were inclosed. Agreeably to this idea, the soffits of the corona (see PLATE XXI.) have their ornaments within the thickness of the borders which receive them.

(139.) The following are the proportions of the principal parts of this order, as appear in its profile, in PLATE XVIII. The whole height of the entire order is divided into five equal parts, one of which is the height of the pedestal; and the remaining 4, which are assigned to the column and entablature, are likewise to be divided into five. One of these belongs to the entablature, and the remaining 4 being divided into 8 equal parts, one of them will be the inferior diameter of the column. Or we may express it thus:

(140.) The whole height of the order, including its pedestal, is 12 modules and a half, reckoning the module a whole diameter. The pedestal is two and a half; the base, shaft, and capital 8; and the whole entablature two modules. Dividing the large diameter into 60 equal parts, called *minutes*; 30 are given to the base, 30 to the capital, 30 to the architrave, 45 to the metope, and 45 to the height of the cornice, including the upper fillet or capital of the triglyph. In this order, when the mutules are introduced in the entablature, as in the example referred to, one module is assigned for the projection of the cornice, which, in this respect, exceeds any of the other orders. The projection of the mutules is equal to their width, being 30 minutes: the width of the triglyphs is exactly the same, and their distance from each other equal to the height of the metope, which, by this division, forms a perfect square. The sides of the channels of the triglyphs are at right angles with each other. The manner

of dividing and drawing them, together with the conic drops, may be learned from PLATE XXI. The soffit of the mutule, and that of the corona, are frequently ornamented; the former with conical drops, similar to those under the triglyphs, and the latter with roses in square and lozenge compartments. (See Plate XXI.) The proportions of the smaller parts, and of the several mouldings which compose the whole, must in this and in every other order, be learned from their respective profiles.

(141.) NAMES of the DIFFERENT PARTS, referred to by Figures in the representation of the DORIC ORDER; PLATE X.

CORNICE. 1. The Fillet. 2. The Cymatium. 3. The Cyma reversa. 4. The Corona. 5. The Ovolo. 6. The Cavetto. 7. The capital of the Triglyph. The FRIEZE. 8. The Triglyph. 9. Metope. 10. The Frieze. The ARCHITRAVE. 11. The Band or Tœnia. 12. The Drops. 13. The Architrave. 14. Ditto first Facia. The CAPITAL. 15. O. G. and Abacus. 16. The Ovolo. 17. The Annulets. 18. The Colorino. 19. The Astragal.

(142.) The BASE of the SHAFT. 20. The Upper Torus. 21. The Scotia. 22. The Lower Torus. 23. The Plinth. The CAPITAL of the PEDESTAL. 24. The Cyma inverted. 25. The Facia. 26. The Hollow. 27. The Dado. The BASE of the PEDESTAL. 28. The Astragal. 29. The Cyma. 30. The Plinth.

SECT. VII. Of the INTERCOLUMNIATION and ARCHES of the DORIC ORDER.

(143.) THE intercolumniation of this order is often attended with peculiar difficulty, arising from the strict regard that is ever paid to the due width of the triglyph, and the perfectly square form of the metopes, or their intervals. Besides, it is absolutely requisite, that a triglyph should be placed exactly over the centre of every column. For these reasons, the mutules and triglyphs have been omitted in capital works, both ancient and modern, as in the Coliseum at Rome, and the Royal Hospital at Greenwich.

(144.) PALLADIO has, however, given one instance of an ancient temple, with angular triglyphs. This structure, which he terms the *Temple of Piety*, is mentioned by Vitruvius, with an eye to the difficulty occasioned by the triglyphs being thus placed; which reduces the intercolumniation of the two angular columns to one diameter and a quarter, which is less than the pycnostyle. The next intercolumniation is still greater, approaching near to the pterostyle, as is evidently necessary to bring the triglyph over the centre of the third column from the angle. The next, which is the centre intercolumniation, and faces the entrance of the temple, is rather more than eustyle, or two diameters and a quarter; and has, in the metopes, ditriglyph. But the intervals, between the triglyph are much too narrow for their height, so as to produce an unfavourable effect. The other spaces are monotriglyph, and are perfect. The regular intercolumniation of the Doric order is the monotriglyph, or pycnostyle, which admits of one between two columns—

and

The ditriglyph, or eustyle, admits two; and the anastyle is tritriglyph, or consisting of three; but the most perfect of these is the ditriglyph.

(145.) When the capitals and bases of coupled Ionic columns have their proper projections, and are at any distance from each other, the metope between them will be rather too wide; but that may be avoided, by confining the projections, or making the triglyph one minute more than it really should be, and placing or removing its centre a minute within the axis of the column, which will make the differences will not be perceived without the nicest examination.

(146.) In small buildings, such as temples, and other similar ornaments for gardens, the intercolumniations may be determined, without paying a strict regard to the general rules for the distances of columns; always observing, however, that each work must have an interval that will admit of an easy passage between them.

(147.) Doric arches, without pedestals, (see pl. XIX.) are seven diameters and three fourths high, and in width four diameters and 15 minutes.—The piers are two modules in front, and in thickness one module, 22½ minutes; or in proportion to their distance from the wall. From centre to centre of each pier, is 6 diameters and 15 minutes. Arches of this order, with pedestals, have their apertures, in height, 9 diameters and 30 minutes; and in their width, 5 diameters, 15 minutes. The piers are 2 diameters, 15 minutes wide in front; and from centre to centre of each, 6 diameters, and 15 minutes.

SECT. VIII. Of the IONIC ORDER, with its VOLUTES.

(148.) THE Ionic order owes its invention to the people of Ionia, who inhabited a Grecian district, and is said to have been first employed in the decorations of the Temple of Diana, at Ephesus. The Ionic column is more slender and graceful than the Doric. Its ornaments are truly elegant, being in a style of composition between the richness of the Corinthian and plainness of the Doric orders. Its general appearance being simple, yet graceful and majestic, in figurative language, it has been compared to a sedate matron, in decent, rather than in rich attire.

(149.) The ancients used the Ionic order in the temples dedicated to Diana, Juno, Apollo, Fortune, Concord, and the like deities. It may be employed in palaces and private houses, in halls of justice, colleges, or libraries; and, in short, as Le Clerc observes, in all places consecrated to peace and tranquillity. In forming the profile, and in adjusting the proportions of this order, most of the modern architects have, in a great degree, imitated the columns, capitals, and entablatures, in the Temple of Manly Fortune and Concord; in the Theatre of Marcellus, and the Museum at Rome. Amongst the ancients, the form of the Ionic profile appears to have been more positively determined, than that of any other order: for in all the antiques at Rome, except in the Temple of Concord, it is exactly the same.

(150.) The proportions of the principal parts of the Ionic column, are as follow: The height

of the entire order is divided into 5 equal parts. One of these parts is assigned to the height of the pedestal; and the remaining 4 are divided into 6, for the column and entablature. One of these is appropriated to the entablature, and the remaining 4 are for the column, including its capital and base. These 4 being divided into equal parts, 1 is assigned for the inferior diameter. The cornice is 44 minutes in height, and its projection the same. The drip in the under side of the corona is channelled out one minute deep, and two minutes from the front; and before the cyma reversa, one minute.

(151.) The shaft of the column is sometimes fluted, and sometimes plain. Twenty, or 24 are the number of flutes allotted, not only to this, but to every other order. In general, however, 24 are preferable. The plan of the flutes may be rather more than a semicircle, as they will then appear more distinct. The fillets, or intervals between them, must not be broader than one third of the flutes, nor less than one fourth: and it should farther be observed, that in the capital of rich compositions over each flute, is placed an ove or egg. For the other particulars, recourse must be had to plates X. and XVIII. In exterior works, when the building is large, the entablature may be enlarged to one fourth of the whole column without its pedestal, as was sometimes practised by the ancients. Palladio, however, makes no distinction of this nature; but allows only one fifth part of the height of the column in all cases.

(152.) The VOLUTE, which is a principal member of this column, is executed in various forms. The Grecian volute has a double fillet winding round to its eye, which, by the partings or spaces between, produces a variety of light and shade, and affords to the whole convolution additional grace and beauty. We are not of opinion, however, that the necking is any additional beauty to the capital, as is supposed by some architects: for the astragal certainly takes off from that pleasing simplicity, and pure elegance of the Roman capital, which is uninterrupted by any projecting moulding, till we view the easy turn of the volute itself. Upon these principles, we prefer the Roman capital. (See its profile, Plate XVIII.) Both the Grecian and Roman capitals are square on the front, but have quite a different appearance when viewed on their sides. See the plan in Plate XXI. It might therefore be eligible, when the decoration is to be continued in flank, as well as in front, to substitute the angular capital, used by Michael Angelo, Scamozzi, and other modern architects, in imitation of those in the Temple of Concord. This capital is alike on all sides; and therefore, occasions no difficulty in the management of angular pilasters or columns: its abacus is drawn in the same manner as that of the Corinthian order.

(153.) The manner of DRAWING the VOLUTE, according to Goldman's method, is as follows: (see Plate XXI.) Draw the perpendicular FA, termed the cathetus, and make its length equal to 15 minutes. On the centre describe a circle, whose diameter is 3½ minutes. Draw next a geometrical square, having its sides equal to the radius of the circle, as 1, 2, 3, 4. From the angles 2, 3, draw diagonals to the centre at C. Divide

the Ionic: and the plan of the capital is the same with that of the Corinthian order.

(161.) The soffit of the corona is divided into square compartments, cut out of the solid, decorated with roses, whose relief must not project more than the borders which inclose them. In rich compositions, the soffits of the modillions are also ornamented; but their relief is not to exceed the horizontal surface, which would greatly injure the effect of the modillion, and render the appearance of the profile of the entablature less pleasing.

SECT. X. Of the CORINTHIAN ORDER.

(162.) The lovers of architecture are indebted to the city of Corinth for this finest of all architectural compositions; in which we see proportion, simplicity, elegance, and richness, combined to a degree almost exceeding imagination, and which we are persuaded will never be surpassed, whilst architecture has an existence. This order is, and will continue to be, a perpetual memorial of the exquisite taste and genius of the ancient Corinthians. Scamozzi calls it the *virginal order*, an epithet truly characteristic of the delicacy and tenderness of composition apparent in the whole.

(163.) Conformably to the whole of its character, the ancients employed it in works of magnificence, grandeur, and delicacy. It obtained a place in palaces, public squares, banqueting rooms, theatres, and the apartments of young ladies. It was also generally used in temples dedicated to female deities, and sometimes in those of Jupiter, Mars, and Mercury. The most perfect model of the Corinthian order is generally allowed to be seen in the three columns in the Campo Vaccino at Rome, the remains, as it is supposed, of the temple of Jupiter Stator.

(164.) The base of the column may be either Ionic or Corinthian, since both are beautiful. The entablature is generally much enriched, particularly by the ancients, who introduced in the frieze representations of various figures. See PLATE X. A very full display of these may be found in Stewart's *Antiquities of Athens*. When the entablature is thus enriched, the columns are fluted, and the flutings may be filled with cablings, one third from the bottom, of the whole height of the shaft, as in the inside of the Pantheon. In most of the antiquities at Rome, the capital of this order is decorated with olive-leaves; the acanthus being seldom employed but in the Composite.

(165.) The following are the general proportions of this order: The whole height of the entire order is divided into 5 equal parts, and one is given for the height of the pedestal. The remaining four are divided into six equal parts; one is assigned for the entablature, and the remaining five are assigned to the height of the column including its base and capital; which are again divided into equal parts, one of which is for the inferior diameter. The base is 30 minutes, and the capital 70 in height. The cornice is 48 minutes, both in height and projection.

(166.) The soffit of the corona is worked in square compartments, as in the Composite; but the soffit of the modillion is ornamented with an olive-leaf, the same as in the capital. The breadth

of the modillion is 10 minutes and a half; and the space between each modillion twice their width. The abacus of the capital is sometimes plain, and sometimes fluted, as in this profile. In some capitals the volutes rise higher than the under side of the abacus, but the capital looks best when they are bounded by its under surface.

(167.) To determine the plan of a capital according to the ancients, draw a geometrical square whose sides are one diameter and a half. To this square draw diagonals; and on these, place from the centre, or their intersection, a space equal to one diameter, through which point lines being drawn at right angles with the diagonals, will determine both the projection and thickness of the volutes. For the curvature of the abacus, extend the compasses from one angle to the other of the side of the abacus; and with this opening, intersect two arches described from the angles of each horn of the abacus, and the point of intersection will be the centre, by which, with the same opening of the compasses, the concavity of the abacus will be accurately drawn. See the PLAN, in Pl. X.

SECT. XI. Of PILASTERS in GENERAL.

(168.) Pilasters differ from columns only in their plan; which is a square, as that of columns is round. Their bases, capitals, and entablatures, have the same parts, with the same heights and projections, as those of columns; they are also distinguished in the same manner, by the names of *Tuscan, Doric, Ionic, Corinthian, and Composite*.

(169.) The column is undoubtedly more perfect than the pilaster. However, they may be employed with great propriety on many occasions. Some authors declaim against pilasters, because, according to them, they do not admit of diminution. But this is a mistake; there are many instances, in the remains of antiquity, of their being diminished. Scamozzi always gave his pilasters the same diminution as his columns: Palladio and Inigo Jones have likewise diminished them in many of their buildings.

(170.) Pilasters are employed in churches, galleries, halls, and other interior decorations, to save room; for, as they seldom project beyond the solid wall above one quarter of their diameter, they do not occupy near so much space as columns. They are likewise used in exterior decorations; sometimes alone, instead of columns, on account of their being less expensive; and sometimes they accompany columns, being placed behind them to support the architraves, where they enter the building, as in the Pantheon at Rome; or, in the same line with them, to fortify the angles, as in the Portico of Septimius.

(171.) Pilasters should project one quarter of their diameter beyond the walls, when used alone. When placed behind columns, especially if they be very near them, they need not project above one eighth of their diameter. But, when placed on a line with columns, their projection must be regulated by that of the columns; and consequently, it can never be less than a semi-diameter, even when the columns are engaged as much as possible.

(172.) The shafts of pilasters are frequently adorned with flutings in the same manner as those of columns; the plan of which may be a trifle



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were only for ornament. See Pl. XX. A thier are to be fixed to the wall in front of the house, so they must be perpendicular to it, and as they are to be seen in the same view with the front of the house, their correspondence with it is equally necessary. They are to be placed on a plinth, and something must be allowed by way of ornament and finishing at the top.

§ 10. All the variations of fancy may be employed in the design of *front*, but it will be proper to observe this general rule, that the design anterior to building, it would never be richer than the front of the house. It, for instance, the front of the house is ornamented with columns of the Ionic order, the Ionic must not be used in the *piers*, and it will be found better to omit columns for *piers*, and to make use of the Tuscan order for *piers*, and to call it the Ionic or Corinthian orders are employed in the *front* of the house, the Ionic or Ionic may be used with propriety in *piers*. One piece of ornament is almost universal in piers, namely, a niche with its seat, made as if for the convenience of weary travellers. On this account, it will be proper to raise the columns on pedestals, because the continued moulding from top to bottom will be a good ornament under the niche. The base of the columns ought always to be Attic.

(194.) Inside doors, however small the building may

may be; should never be narrower than 2 feet 9 inches; nor should they ever, in private houses, exceed 3 feet 6 inches in breadth, which is more than sufficient to admit the bulkiest person. Their height should at least be 6 feet 3 or 4 inches; otherwise a tall person cannot pass without stooping. In churches, palaces, &c. where there is a constant ingress and egress of people, the apertures must be larger. The smallest breadth that can be given to a gate is $8\frac{1}{2}$ or 9 feet, which is but just sufficient for the passage of a coach.

SECT. IV. Of NICHES and STATUES.

(195.) In every age almost, since architecture became improved, it has been customary to enrich different parts of buildings with representations of the human body. Thus the ancients adorned their temples, baths, theatres, &c. with statues of their deities, heroes, and legislators.—The moderns still preserve the same custom, placing in their churches, palaces, &c. statues of illustrious persons, and even groups composed of various figures, representing occurrences collected from history, fables, &c. Sometimes these statues or groups are detached, raised on pedestals, and placed contiguous to the walls of a building, or in the middle of a room, court, or public square. But they are most frequently placed in cavities made in the walls, called *niches*.

(196.) There are two sorts of NICHES; the one formed like an arch in its elevation, and semicircular or semielliptical in its plan; the other is a parallelogram both in its plan and elevation.—The proportion of both these depends on the characters of the statues, or the general form of the groups placed in them. The lowest are at least a double square in height; and the highest never exceed $2\frac{1}{2}$ of their breadth.

(197.) When niches are alone in a composition, they are generally inclosed in a pannel, formed and proportioned like the aperture of a window, and adorned in the same manner. In this case the niche is carried quite down to the bottom; but on the sides and at the top, a small space is left between the niche and the architrave of the pannel. And when niches are intermixed with windows, they may be adorned in the same manner with the windows, provided the ornaments be of the same figure and dimensions with those of the windows.

(198.) The size of the statues depends on the dimensions of the niches. They should neither be so large as to have the appearance of being rammed into the niches, as in Santa Maria Majora at Rome; nor so small as to seem lost in them, as in the Pantheon. The distance between the outline of the statue and side of the niche should never be less than one third of a head, nor more than one half, whether the niche be square or arched; and when it is square, the distance from the top of the head to the ceiling of the niche should not be greater than the distance on the sides.

(199.) Statues are generally raised on a plinth, the height of which may be from one third to one half of a head; and sometimes where the niches are large the statues may be raised on small pedestals. The height of the statue should always be in proportion to the character of the architecture

with which it is surrounded. If the order be Doric, Hercules, Jupiter, Mars, Æsculapius, and all male statues, representing beings of a robust and grave nature, may be introduced; if Ionic, then Apollo, Bacchus, &c. and if Corinthian, Venus, Flora, and others of a delicate nature should be employed.

SECT. V. Of CHIMNEY-PIECES.

(200.) Among the ancients there are very few examples of chimney-pieces to be met with. Neither the Italians nor French have excelled in compositions of this kind; but Britain, possessed of many able sculptors at different times, has occasionally surpassed all other nations, both in taste of design and workmanship. The size of the chimney must be regulated by the dimensions of the room where it is placed. In the smallest apartments, the breadth of the aperture should never be less than 3 feet, or 3 feet 6 inches. In rooms from 20 to 24 feet square, or of equal superficial dimensions, it may be from 4 to $4\frac{1}{2}$ feet broad; in those of 24 to 27, from $4\frac{1}{2}$ to 5; and in such as exceed these dimensions, the aperture may even be extended to $5\frac{1}{2}$ or 6 feet.

(201.) The chimney should always be situated so as to be immediately seen by those who enter the room. The middle of the partition wall is the most proper place in halls, saloons, and other rooms of passage; but in drawing-rooms, dressing-rooms, and the like, the middle of the back wall is the best situation. In bed-rooms, the chimney is always in the middle of one of the partition walls; and in closets and other very small places, to save room, it is put in a corner.

(202.) Wherever two chimneys are used in the same room, they should be placed either directly facing each other, if in different walls, or at equal distances from the centre of the wall in which they both are. The proportion of the apertures of chimney-pieces of a moderate size is generally a perfect square; in small ones it is a trifle higher; and in large ones, a trifle lower.

(203.) The ornaments of chimney-pieces consist in architraves, friezes, cornices, columns, pilasters, termini, caryatides, consoles, and all kinds of ornaments of sculptor, representing animals and vegetables, &c. likewise vases, chalices, trophies of arms, &c. In designing them regard must be had to the nature of the place where they are to be employed. Such as are intended for halls, saloons, guard-rooms, galleries, and other large places, must be composed of large parts, few in number, of distinct and simple forms, and having a bold relief; but chimney-pieces for drawing-rooms, dressing-rooms, &c. may be of a more delicate and complicated nature.

SECT. VI. Of STAIR-CASES, and HAND RAILS.

(204.) STAIR-CASES ought to be so constructed as to make the ascent safe, agreeable, and easy.—To fix on a proper and advantageous situation, for a stair-case is often attended with difficulty; but without this the internal convenience and beauty of a house will be much injured. Palladio is of opinion, that the entrance to a stair-case ought to be situated, so as the principal parts of a building may be seen before we ascend the steps: and

and upon this principle it is observable, that a more easy access is gained to the principal apartments on the ground floor.

(205.) To render stairs easy of ascent, the height of a step ought not to exceed 7 inches, nor in any case to be less than 4, but six inches is a general height. The breadth of the steps should not be less than 12 inches, if it can possibly be avoided; nor should they ever be more than 18; and to render our ascent free from the interruption of persons descending, their length should not exceed 12, nor be less than 4 feet, except in common and small buildings, whose area will not admit of a stair case of more than 3 feet. That the ascent may be both safe and agreeable, it is requisite also to introduce some convenient aperture for light, which ought to be as nearly opposite to our first entrance to the stairs, as the nature of the building will admit of. An equal distribution of light to each flight of stairs ought to be particularly regarded; for which reason, these apertures or windows are commonly placed at the landings or half spaces; though sometimes the whole is lighted from a dome.

(206.) Stair-cases whose plans are circular, are of various kinds. Some wind round a newel or column, in the middle, and the risers of the steps are straight, and sometimes curved. Others form a well or void space, in the centre. The same may be observed of those whose plans are elliptical: the most common however, are those whose plans are a square or parallelogram. The ancients paid a superstitious regard to an odd number in their flights of steps; as 3, 5, 7, &c. in order that in their ascent, they might begin and finish with the right foot. Palladio therefore, allows to the stair-case of a dwelling-house, 11 or 13 steps to each flight.

(207.) When a stair-case winds round a newel, whether its plan be circular or elliptical, the diameter being divided into three equal parts, two are set apart for the steps, and one for the column. But in circular or elliptical stair-cases that are open, or which form a well in the middle, the diameter is divided into four equal parts; two for the steps, and two for the void space in the centre. Modern stair-cases however, have often a kind of well of a mixed form; straight on each side, and circular at the returns of each flight. The openings of these wells are various in width, but seldom exceed 18 or 20 inches.

(208.) Most stair-cases, both for convenience and ornament, ought to have HANDRAILS. These generally begin from the ground by a twisted scroll, which, when skilfully managed, produces a very good effect. To assist in the construction of these, we shall offer the following observations, as illustrated by the various figures in Plate XXIII. In figure 1, we have the plan of the first step, turned with a scroll to receive the newel post and sustainers of the twisted hand-rail: *a* is the projecting nosing of the step; *b* the thickness of the bracket, and *c* the string board. To draw the scroll proceed thus: Let the space 1, 3, in fig. 1, be considered as equal to the spring of the scroll from its centre to the straight part of the hand rail, as from O to 1, fig. 3. Divide 1, 3, into three equal parts; and drawing the line 4, 3, at right

angles to 1, 3, make it equal to one more of these parts. Draw then the diagonal 4, 1; and from the centre 4, describe the arch 3, 5. Divide the arch into 12 equal parts; and through these divisions, draw the radii till they intersect the line 3, 1, as at 2, 3, 4, &c. which completes the scale for drawing the scroll. Supposing that the several radial lines; 1, 2, 3, 4, &c. in fig. 3, are already drawn, proceed thus: Take from fig. 2 the space 3, 2, and place it at fig. 3, from the centre O to 2. On 2 with the same opening, fix one foot of the compasses, and with the other strike a short curve line, as at C, and from 1 with this opening, describe another, intersecting it at C. From the centre C thus found, draw the arch, 2, 1. Again, from fig. 2 take the space 3, 3, and place it from O on the radial 3: with this opening, find the centre as before, and draw the arch 3, 2, proceeding in the same way with the rest. By contracting the line 4, 3, in fig. 2, it is evident, that a scroll may be drawn more open, or with less convolution, as in fig. 4; consequently, by increasing the length 4, 3, the scroll will acquire more convolution; and therefore we may, by these means, vary the scroll as we please. In fig. 5, is shewn the pitch board or raking of the steps, in order to determine the falling mould of the twist. The dotted lines drawn from the hand rail to the pitch-board, shew its width, which is to be kept level, as it winds about. The lines *a*, 3, *b*, 2, continued round to D, shew how much half the width of the rail rises on the pitch-board, from its beginning to 3. D exhibits the same pitch-board; and the method of finding the outside mould for the twist of the hand rail, after its sides are so squared as to be every way in a perpendicular direction to its ground plan. But this cannot be done without first finding the mould for the hand-rail, which may be done thus: Consider B in fig. 6, as that part of the plan of the hand-rail, comprehended between 1, 3, fig. 3. D is the pitch-board, which gives the rake or bevel of the hand rail; which, being divided into any number of equal parts, draw ordinates to the plan B, as *a*, *b*. From the raking line, *c*, *d*, draw the corresponding ordinates at right angles with it; and by the compasses transfer the several ordinates from 3 to G, as, *a*, *b*, to *e*, *d*, and 1, 2, 3, 4, respectively: then, by drawing a curve line through these points, G will become an accurate mould for the upper side of the hand rail.

(209.) As however the twist of the hand rail requires a greater substance of wood than the straight part, this may easily be determined thus: Draw the square of the hand rail on the pitch-board, as *a* in fig. 7; and parallel lines from the opposite angles will shew the thickness required, as at 1, 2. Agreeably to this, *l*, *m*, *n*, in fig. 8, shew the manner of glewing the rail with the additional thickness of wood before described. It is made of so many pieces, and varied in glewing, to assist in more easily forming the twist. The best method, in fact, is to glew these in the straight way of the grain, by which, if the wood be properly matched, the whole will appear one solid piece. To reduce these pieces properly, and to produce in the whole twist an agreeable turn, it will be requisite

made about one inch larger at the bottom of both in depth and thickness; which strengthens the roof by admitting larger tenons into the principal beams, and by becoming lighter at the top.

(121.) If the rafters be small, as 8 feet in length, their scantlings may be $4\frac{1}{2}$ inches by 3 inches thick:

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12,	6	—	3	—

SECT. IX. Of CIELINGS.

(122.) Cielings in churches and temples may be considered as the interior coverings of their roofs, as there is nothing between them but the necessary framing by which the whole is supported. For dwelling houses the simplest and most common sort are those which are flat. These are generally adorned with principal compartments, surrounded with mouldings, either set into the cieling or projecting from it. Their ornaments and mouldings do not require a bold relief; but being near the eye, they must be finished with neatness and taste.

(123.) Coved cielings are certainly much more beautiful than flat ones; but their execution is attended with more expence. They are used promiscuously in large and small rooms, and occupy from one fifth to one third of the height of the room. But where the architect is at liberty to proportion the height of the room to its superficial dimensions, the most eligible proportion for the cove is one fourth of the whole height of the room. The figure of the cove is commonly either a quadrant of a circle or of an ellipsis, taking its rise a little above the cornice, and finishing at the border and the great pannel in the centre. The border projects somewhat beyond the coves on the outside; and on the side towards the pannel, it is generally made of sufficient depth to admit the ornaments of an architrave.

(124.) When the profiles of rooms are gilt, the cielings ought likewise to be gilt. The usual method is to gild all the ornaments, and leave the ground white, pearl-colour, light blue, or any other that may be proper to set off the gilding to advantage.

(125.) Historical and other paintings are often introduced with good effect in the centre and angular compartments of large cielings; and of late invention of painted silk and satin in various ornaments from the antique, has been introduced, to adorn the profiles of walls of rooms. These are enclosed in pannels, pilasters, and tablets, according to their situation; and, when they have suitable mouldings, produce a very pleasing and splendid effect.

PART IV.

OF THE ERECTION OF BUILDINGS IN GENERAL.

SECT. I. Of the PRINCIPLES to be observed in ERECTING BUILDINGS.

(126.) The rules of building require, that in every fabric, there should be solidity, convenience and beauty; to which, according to some of the most refined masters, are added, order, disposition, proportion, decorum, and economy. These particulars are considered by the most skilful

architects as absolutely requisite in the planning, erecting, and finishing an entire fabric.

(127.) Solidity implies the choice of a good foundation and proper materials to work with, as well as their judicious application. Convenience demands such a disposition of the various parts of a structure, that they may not crowd and embarrass each other, to appear disagreeable to a spectator. Of beauty we already have treated. Order gives each part of the building a proportionate extent; such as is adapted to the magnitude of the whole. Disposition is the due ranging and agreeable union of all the parts, including a proper and convenient arrangement of the various apartments of the whole fabric. Proportion is the relation that the whole work has to its constituent parts, and which each part has to the complete idea of the whole; for in buildings that are perfect in their kind, from any particular part we may form a tolerable judgment of the whole. Decorum consists in making the whole aspect of the fabric so correct, that nothing shall appear, but what is founded in the principles of reason, geometry, and delicacy of judgment. It includes design, or the choice of one situation in preference to another, which we may conceive improper for the kind of building we are about to erect; and directs us to pitch upon different prospects or views for different parts of an edifice. Economy instructs the architect to have regard to the expence of his whole design, which will be greatly effected by a choice of such materials, as are not only proper for his purpose, but of the cheapest of the kind which are proper.

SECT. II. Of FOUNDATIONS.

(128.) The best foundation is that which consists of gravel or stone; but in order to know whether the inferior strata are sufficient for the support of the building, it will be advisable to sink wells at some little distance. By attending to what is thrown up in the digging these, the architect will be acquainted with what lies under the stony or gravelly bed which on the surface promises so much security, and will know what measures to take.

(129.) But though a stony or gravelly bottom is undoubtedly the most sure and firm, where all is found beneath, there is no kind of ground which may prove more fallacious, or occasion such terrible accidents. The reason is, that such ground often contains absolute vacuities; nor is rock itself, though a foundation upon a rock is strong even to a proverb, free from danger of the same kind. Caverns are very frequent in rocky places; and should an heavy building be erected over one of these, it might suddenly fall down altogether.

(130.) To guard against accidents of this kind, Palladio advises the throwing down great weights forcibly on the ground, and observing whether it sounds hollow, or shakes. He says, if a drum be placed on the suspected ground near to a vessel filled with water, a gentle stroke will not rebound nor ruffle the surface of the water, if the earth be solid; but, if it be hollow, the effects produced will very clearly shew it.

(131.) Where the foundation is gravel, it will be proper to examine the thickness of the stratum,

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1. The first part of the document is a list of names and their corresponding addresses. The names are: John Doe, Jane Smith, and Bob Johnson. The addresses are: 123 Main St, 456 Elm St, and 789 Oak St.

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to small or close, that there is not a sufficient current of air to drive up the smoke. Almost all that can be done, while the walls are constructing, to prevent smoke, is, to make the chimney vent narrower at bottom than at top: yet this must not be carried to an extreme; because the smoke will then linger in the upper part, and all the force of the draught will not be able to send it up.—For curing smoky chimneys in houses already built, see CHIMNEY.

(240.) After the walls are finished, the roof is the next consideration: but concerning it very little can be said, only that its weight must be proportioned to the strength of the walls. It must be contrived as to press equally upon the building; and the inner walls must bear their share of the load as well as the outer ones. A roof ought neither to be too massy nor too light; as being necessary for keeping the walls together by its pressure, which it is incapable of doing while too light; and if too heavy, it is in danger of throwing them down. Of these two extremes, however, the last is to be accounted the worst.

(241.) Floors are most commonly made of wood; in which case, it is necessary that it be well seasoned by being kept a considerable time before it is used. The floors of the same storey should be all perfectly on a level; not even a threshold rising above the rest: and if in any part there is a room or closet whose floor is not perfectly level, it ought not to be left so, but raised to an equality with the rest; what is wanting of the true floor being supplied by a false one.

(242.) The floors of low houses may be made of clay, ox blood, and a moderate portion of sharp sand. These three ingredients, beaten thoroughly together and well spread, make a firm good floor, and of a beautiful colour. In elegant houses, the floors of this kind are made of Paris plaster, beaten and sifted, and mixed with other ingredients. This may be coloured to any hue by the addition of proper substances; and, when well worked and laid, makes a very beautiful floor. Besides these, halls, and some other good rooms, are paved or floored with marble or stone; and this either plain or dotted, or of a variety of colours: but the universal practice of carpeting has in a great measure set aside ornamental work upon floors. In country buildings, also, floors are frequently made of bricks and tiles. These, according to their shapes, may be laid in a variety of figures; and they are also capable of some variation in colour, according to the nature of the earth from which they were made. They may be laid at any time; but those of earth or plaster, are best made in the beginning of summer, for the sake of drying.

SECT. IV. *Of the DISTRIBUTION of the APARTMENTS of HOUSES, &c.*

(243.) The distribution of the apartments of houses must of necessity be directed by the way of life in which the inhabitants are engaged. In the country, this is commonly farming; and therefore besides the house for the family, there is also necessary a barn for the reception of the produce of the ground, a stable for cattle, a cart

house for keeping the utensils under cover, and sheds for other uses.

(244.) To accomplish these purposes, let a piece of ground be taken of five times the extent of the front of the house, and inclosed in the least expensive manner. Back in the centre of this let the house be placed, and in the front of the ground the barn and the stable, with the adjoining sheds. These are to be set, one on each side, to the extreme measure of the inclosed ground: they will thus fill up a part of the entrance, and will leave all about the house some inclosed ground by way of yard. From the barn to the stable may be extended a fence with a gate in the middle, and this gate ought to front the door of the house.

(245.) The plan of the house and out buildings may be made as follows. The door may open into a plain brick passage, at the end of which may be carried up a small stair-case. On one side of the passage may be a common kitchen; and on the other a large room, which will serve the family by way of parlour. Beyond this may stand on one side the pantry, and on the other the dairy room, the last being twice the size of the former. They are placed on the same side with the parlour, on account of the heat of the kitchen, which renders it improper to be near them. On the kitchen side, a brew house may very conveniently be placed. More rooms may be added on the ground floor as occasion requires; and the upper storey should be divided into bed chambers for the family, with garrets over them for the servants.

(246.) A gentleman's country seat must be built on a more elegant plan. Here the front may extend 65 feet in length, the depth in the centre being 40 feet, and in each of the wings 45. The offices may be disposed in wings; the kitchen in the one, and the stables in the other; both of which, however, may correspond in their front with the rest of the building, which they ought also to do with one another. These wings may have a projection of 13 feet from the dwelling house, to which they ought to be connected, not by straight lines, but by curves. The best proportion of these offices to a house extending 65 feet in front, is 35 feet. If they are smaller the house will look gigantic; if larger they will lessen its aspect. To a front of 35 feet, a depth of 48 is a very good proportion.

(247.) There ought also to be a covered communication between the dwelling house and offices, which should not appear to be a plain blank wall, but ought to be ornamented with gates. The arch by which the offices are joined to the dwelling house must be proportioned to the extent of the buildings; and there cannot be a better proportion than five feet within the angles of the buildings. The wings which have only a projection of 13 feet, will appear to have one of 18, and the light will be agreeably broken.

(248.) As to the internal distribution of a house of this kind, the under storey may be conveniently divided into 3 rooms. The hall, which is in the centre will occupy the whole of the projecting part, having a room on each side. The length of the hall must be 24 feet, and its breadth 12; the rooms on each side of it must be 16 feet long, and

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proportion to their number, will relieve the abutments.

(157.) The ancients, as well as the moderns, affected to a bridge an even number of piers, in order that an arch, and not a pier, may be upon the centre of the river. This is, indeed, founded not merely on the principles of beauty, but of philosophy and utility; since, in general, it is found that the strongest current runs in the centre of a river, which therefore clears itself in the centre of a hold arch, and makes it less dangerous to the piers near the centre.

(158.) The size of the pier must be determined by the width of the arch, and, according to Palladio, should never be less than one sixth part of its width, nor more than one fourth. In the plans of most bridges, they are generally drawn of an oval figure, having two long sides parallel to each other, and at the ends of them, are placed two short ones, facing the course of the river at right angles to each other. Palladio sometimes made semicircular, facing each other, in order to divide the water, and diminish the force of the current, which are impetuously brought down upon them, when they strike against them, running down from the piers, and pass through the arch of the bridge.

As to the proper dimensions of the key stones and archivolts, he gives to their height a proportion of the width of the arch. This proportion is somewhat smaller than that proposed by Mr. Gautier, an experienced engineer, who gives to the length of the arch stones, of an arch 24 feet wide, two feet; and to arches 45, 60, 75, or 90 feet wide, he gives 3, 4, 5, and 6 feet respectively, and more than this, when the stone is of a soft nature. But Mr. Belidore says, the length of the key stones ought always to be one sixth part of the width of the arch, whether the stone be hard or soft, because, if they are soft, their weight is proportionably less.

(158.) It appears somewhat strange, that scientific men should differ so widely about the size of a key stone. The most illiterate pretenders to the science could scarcely vary more in their opinions respecting the suitable proportion of a key stone, than the difference between one and two feet in an arch of 24 feet wide. To what can such a ridiculous difference be attributed, but to mere modern caprice? or what other tendency can it have, but to excite laughter? However, as a proper medium between the two extremes, we may recommend the judicious proportions adopted by that learned architect, Palladio, in a bridge over a river, 180 feet wide; which he divided into three arches, giving 60 feet to the centre arch, and to the other two, 48 feet each. The piers, which he terms *pilasters*, were 12 feet thick, or one fifth of the width of the middle arch, and a fourth of the smaller ones. The arches were a small portion less than a semicircle; and their archivolt one 17th of the aperture of the centre arch; and a 14th part of the other two. According to this proportion, the key stone of the centre arch was 3 feet 6 inches long, but, according to Mr. Gautier, it should have been 4 feet, and agreeably to Mr. Belidore, only 2 feet 10 inches. In an arch of 24 feet, Palladio's rule

makes the length of the key stone a small part more than 16 inches, which is a much more eligible size than either the one or the two feet key stone of the former gentlemen.

(159.) Upon the thickness of the key stones, ancient authors say nothing; nor have the moderns proposed any determined rule. This silence is probably owing to their being considered in common with other rustic works, whose thickness is as 4 to 6.

(160.) The width commonly allowed to small bridges, is 30 feet; but in large ones, near great towns, these 30 feet are allowed clear for horses and carriages, besides a *banquette* on each side for foot passengers of 6 to 9 feet each, raised about 2 feet above the common road; the parapet walls on each side are about 18 inches thick, and 4 feet high; they generally project the bridge with a cornice underneath; sometimes balustrades of stone or iron are placed upon the parapet, as at Westminster and Edinburgh; but this is only practised where a bridge is of great length, and built on a magnificent plan.

(161.) The ends of the bridges open from the middle of the two large arches with two wings, making an angle of 45 degrees with the rest, in order to make their entrance more free; these wings are supported by a continuation of the arches; that immediately under each wing being smaller than the rest. But the wings of bridges are generally supported by the solid abutment alone.

SECT. II. Of LAYING the FOUNDATIONS of PIERS, and CONDUCTING the WORK.

(162.) THE most proper season for laying the foundations of a bridge is in autumn, when the waters are lowest, and when the weather is suitable for aquatic undertakings. The ancients used several methods to obtain a lasting foundation for their stone bridges. Some of these we think it proper to describe, that the reader may form his own judgment, by comparing the ancient with the modern practice.

(163.) ALBERTI, who is reckoned among the first who wrote on bridges, gives us the following directions for laying the foundation of a pier.—“First raise an inclosure to keep off the water, by driving a double row of stakes very close and thick set, with their heads above the top of the water, like a trench. Then put hurdles within this double row of stakes. Close that side of the row which is next to the intended pier, and fill up the hollow between the two rows with rushes and mud, ramming them together so hard, that no water can possibly get through. Then, whatever you find within this inclosure, water, mud, sand, or whatever else is a hindrance to you, throw out, and dig till you come at a solid foundation; or if you find it necessary, make a foundation of wooden piles burnt at the ends, and driven in as close together as possible. And here I have observed, that the best architects used to make a continued foundation of the whole length of the bridge, and not merely under each pier; and this they did, not by shutting up the whole river at once, by one single inclosure, but by first excluding one part, then another, and so joining the

the whole together by degrees: for it would be impossible to withstand and repel the whole force of the water at once. We must therefore, while we are at work on one part, leave another part open for a passage for the stream. You may leave these passages either in the channel itself, or if you think it more convenient, you may frame wooden dams or hanging channels, by which the superfluous water may run off: but, if you find the expence of a continued foundation for the whole bridge too great, you may only make a separate foundation for every particular pier, in the form of a ship, with one angle in the stern, and another in the head, lying directly even with the current of the water, that the force of the water may be broken by the angles. We are to remember, that the water is much more dangerous to the stern, than to the head of the pier."

(264.) PALLADIO, who is the next writer, says, "To lay the foundations of pilasters, if the bed of the river be stone or gravel stone, you have the foundation without any trouble; but in case the bottom be quicksand or gravel, you must dig therein, till you come to solid or firm ground; or if that should be found too laborious or impracticable, you must dig moderately deep in the sand or gravel, and then you must thrust in oaken piles, which will reach the solid or firm ground, with the iron by which their points are to be armed. A part only of the bed of the river must be inclosed from the water, and then we are to build there; that the other part being left open, the water may have its free current; and so go on from part to part."

(265.) SCAMOZZI proposes 3 different methods; viz. I. By driving a double row of piles, and filling in between them chalk, or some close materials, and afterwards pumping out the water, and then drive other piles within these to form the foundation of the piers. This being done, a platform of oak plank is to be framed and laid upon these piles, on which the stonework of the pier is to rest.

(266.) II. His 2d scheme is, after having founded the river and levelled its bed, to make a strong oaken frame, or *grillage* as he terms it, which is to be buoyed up with boats, and to lay on it a thick stratum of stones, well cramped together with iron, and jointed with strong tarrafs, he directs it to be let down gently to the bed of the river.

(267.) III. After having turned off the course of the river to one side, by means of fences or channels sunk on one side of the bed of the river, he made a dam with piles entirely across the river, sufficiently wide to form the piers in; and when he had by digging obtained a proper foundation, he proceeded to build all his piers together, and having raised them above low water mark, he again turned the channel of the river into its former place.

(268.) The various circumstances of different rivers seem evidently to have given occasion to these 3 methods in the course of Scamozzi's practice; not that he considered any of them alike practicable in all cases. His first method, we presume, was applied in those cases where a river was deep, and destitute of a good natural bed. His

second was probably adopted when a river was moderately deep, but of a natural good foundation in its bed capable of supporting a heavy pier, founded on a strong frame of oak immediately let down upon it, without the infinite trouble of piling, damming, and pumping off the water. His 3d scheme we suppose to have been applied in formidable shallow and narrow rivers, canals, or brooks, &c. where there was a suitable place for turning the course of the water, either by a wooden fence placed in a diagonal or sloping direction across the river, or, when the ground on one side of the river formed a peninsula, or something approaching to it, in which case, by digging through the neck of land, it was easy to turn off the stream to one side, and equally easy to bring it back again.

(269.) Such was the situation of TRAJAN's magnificent bridge over the Danube; of which Dion Cassius gives us the following account: "Trajan built a bridge over the Danube, which in truth one cannot sufficiently admire; for though all the works of Trajan are very magnificent, yet this far exceeds all the others: the piers were 20 in number, of square stone; each of them 150 feet high above the foundation, 60 feet in breadth, and distant from one another 170 feet. Though the expence of this work must have been exceeding great, yet it becomes more extraordinary by the river's being very rapid, and its bottom of a soft nature: where the bridge was built, was the narrowest part of the river thereabout, for in most others it is double or triple this breadth; and although on this account it became so much the deeper and the more rigid, yet no other place was so suitable for this undertaking. The aqueduct was afterwards broken down by Adrian; but the piers are still remaining, which seem as it were to testify that there is nothing which human ingenuity is not able to effect." The whole length of this bridge was 1590 yards. Some authors add, that it was built in one summer, and that Apollonius of Damascus was the architect, who left behind him a description of this great work.

(270.) Most of the French bridges have been built on the principles of Scamozzi's first method, viz. by driving oak piles and keeping off the water: this they call a *battardeau*, which we stile a *coffer-dam*.

(271.) The piers of WESTMINSTER bridge were founded by an improved kind of coffer-dam, made capable of floating and rising again after being sunk with two or three of the first courses of stone for the pier. The bed of the river being of the best kind, they had little more to do than to lay it; for previous to this operation, they had driven in large piles all round, about 5 feet clear of the dimensions of the coffer-dam. These piles served both as a defence to the coffer-dams and to secure them in their place when sunk.

(272.) Having laid the first course of stones on the bottom of the coffer-dam, they drew it exactly over the place where it was to be sunk, and by opening a sluice made for the purpose in the side of this vessel, the water came in and sunk it.—During about two hours before low water mark, they employed their pumps to draw off the water again, by which means the coffer-dam was once more raised to the surface, so as to afford them

an opportunity of correcting such uneven parts of the foundation as they might have observed in their experiment. To the first course they now added two more, cramping each stone together, and filling every joint with tarras mortar; and after having so done, they again opened their sluice and sunk the machine, and deposited the stone work in the manner just related. By this means they soon brought the work to within two feet of low water mark, and by the next tide they were enabled to get above it. The sides of the coffer-dam were so contrived, that by relieving a number of iron wedges, they detached themselves from the bottom, and were at liberty to be used for another pier, by being again fixed to a new bottom. It should also be observed, that when the tide was at its height, the coffer-dam was about 6 feet under the surface of the water; but being loaded with 3 courses of stones, and well secured by ropes fastened to the piles, it remained unmoved by the tide.

(273.) Here it will be very natural to enquire why the coffers were not made sufficiently deep to exclude the water at its greatest height? The answer is easy, when the circumstances are known; for, if it be considered, that the water at its full height rose 16 feet, and that the bed of the river where the pier stood was sunk about 6 feet, a coffer 12 feet high would have been required, a size completely unmanageable; and as they also had a sluice in the side of the coffer just on a level with low water mark, and by which all the superincumbent water was easily got rid of, it was evidently unnecessary to have the coffer higher than 12 feet. The circumstance of the coffer's being so much under water, far from impeding, rather facilitated the execution of the work; for all the water above the edges of the coffer cleared itself with greater facility than that within, which passed through the sluice. As for the remaining water below the sluice, it was carried off by a number of chain pumps, so that the workmen were shortly enabled to bring the pier above water.— Thus was every pier raised above low water mark; and in the course of 7 years, the whole bridge was completed.

(274.) Since that period, however, some of the arches have exhibited marks of injury and decay; and a method of repairing them, and reducing the enormous weight of the stone work, by means of spandral walls on the back of the damaged arches, has been projected by a certain architect, who supposes that there are not less than 500 tons of not merely superfluous, but injurious weight upon them.

(275.) The foundation of Essex bridge in Dublin was laid in 1753, in a very deep and rapid stream by Mr Semple, who adopted the following method. Round the place where the intended pier was to rest, the workmen drove, at about 30 inches distance from each other both ways, two rows of strong piles, which were left at the height of low-water mark. These piles were lined with planks, within which they rammed a quantity of clay, and thus formed the external wall of the coffer-dam. Within this wall, and at about the same distances, they drove in a row of piles dovetailed at their edges so as to receive each other,

and which formed the extremities of the plan of the piers at the level of the bed of the river. After having dug to a fine stratum of sand about 4 feet lower, within these there were a great number of other piles of oak driven as deep as they possibly could be made to penetrate. They next filled up the voids or intervals of these piles; and in order to produce a solid and petrified foundation, they employed mortar of a peculiar quality, made up of roach lime and sharp gravel; and with this they began to lay the first course, ramming in large flat stones upon it to about a foot thick. On this first course they laid a plentiful coat of dry lime and gravel of the same quality, on which they again laid stones, and then proceeded to lay mortar as at first, and continued to do so alternately till they came to a perfect level with the piles. Fastened down to the end of these piles were laid three beams, stretching the whole length of the pier from sterling to sterling, the intervals being filled up with masonry. On this platform, which was four feet six inches under low-water mark, they began to lay the first course of stones for the pier cramped together, and jointed with terrass as usual, and went forward till they came to a level with the water at ebb tide.

(276.) About the year 1765, the foundation of a stone bridge across the river Tees, near Stockton, was laid by Mr Shout, and we shall here mention those few particulars in which his method differed from the preceding. The workmen began with first making very strong coffers of solid fir timber about ten feet square, which they piled, jointed, and secured one upon another till they had gained a sufficient height to exclude the water at its highest tide. The joints of these timbers they caulked in the same manner as ships are; and launching them without any bottoms, they fixed them down to their respective stations in the river. On the outside and inside they drove a number of piles, which they boarded and rammed with clay, to prevent the water from oozing in at the bottom of the coffers. This indeed was their greatest difficulty, for, owing to quick-sands and other loose strata through which the water sprang in, the labour of digging to the proper kind of foundation was immense. The chain pumps played incessantly, and by a resolute perseverance, the work, which at some periods seemed to bid defiance to human industry and skill, was at length brought above low-water mark, and the completion of the whole occupied a space of time nearly equal to Westminster bridge. The bridge is neat and plain, and continues a proof of the solidity of its foundation.

(277.) In some cases, when there is a great depth of water, and the bed of the river is tolerably level, or where it can be made so by any contrivance, a very strong frame of timber about four times as large as the base of the piers may be let down with stones upon it round the edges to make it sink: after fixing it level, piles must be driven about it to keep it in its place; and then the foundation may be laid in coffers as before, which are to be kept steady by means of ropes tied to the piles.

(278.) This method has frequently been used in Russia; and though the bed of the

very solid, yet such a grate, when once well settled with the weight of the pier upon it, will be as firm as if piles had been driven under the foundation; but to prevent the water from gulling under the foundation, and to secure it against all accidents, a row of dove-tail piles must be driven quite round the grating: this precaution being taken, the foundation will be as secure as any that can be made.

(279.) The French engineers make use of another method in raising the foundations of masonry under water; which is, to drive a row of piles round the intended place, nearer to, or farther from, each other, according as the water is more deep or shallow: these piles, being strongly bound together in several places with horizontal tie-beams, serve to support a row of dove-tail piles driven within them: when this is done, and all well secured according to the situation and circumstances, they dig the foundation by means of a machine with scoops, invented for that purpose, until they come to a solid bed of gravel or clay; or if the bed of the river is of a soft consistence to a great depth, it is dug only to about six feet, and a grate of timber is laid upon it, which is well secured with piles driven into the opposite corners of each square, not regarding whether they exceed the upper surface of the grate much or not.

(280.) When the foundation is thus prepared, they make a kind of mortar called *beton*, which consists of 12 parts of pozolano or Dutch terrass, 6 of good sand, 9 of unslacked lime, the best that can be had, 13 of stone splinters not exceeding the bigness of an egg, and three parts of tile-duft, cinders, or scales of iron out of a forge: this being well worked together must be left standing for about 24 hours, or till it becomes so hard as not to be separated without a pick-ax.

(281.) They then throw into the coffer a bed of rubble stone, not very large, and spread them all over the bottom as nearly level as they can; they next sink a box full of this hard mortar, broken into pieces, till it come within a little of the bottom; the box is so contrived as to be overset or turned upside down at any depth; which being done, the pieces of mortar soften, and so fill up the vacant spaces between the stones; by these means they sink as much of it as will form a bed of about 12 inches deep all over: they then throw in another bed of stone, and continue alternately to throw one of mortar and one of stone till the work approaches near the surface of the water where it is levelled, and then the rest is finished with stones in the usual manner.

(282.) Mr Belidor says, in the second part of his *Hydraulics*, vol. ii. p. 188, that Mr Millet de Montville having filled a coffer, containing 27 cubic feet, with masonry made of this mortar, and sunk it into the sea, it was there left standing for two months, and when it was taken out again it was harder than stone itself.

SECT. III. Of WOODEN BRIDGES.

(283.) Wooden bridges may be constructed by various methods so as to answer most of the purposes of stone bridges, and even to last a considerable time. See Plate XXIII.

(284.) The invention of wooden bridges is certainly prior to those of stone: two or three different kinds of them are described by Palladio, after the manner of the ancients. Some of these are one continued frame of wood composed of a number of parts, and connected together by lap joints and iron bolts extending quite across the river, without any piles to support them; depending entirely on the trussed parapets, and on the manner of fixing these frames on the stone abutments. Palladio built one at Bassano about 200 feet long by 26 broad, which he divided into five apertures, supported and framed as that represented in the plate, which was partly taken from his.

(285.) The principal and most essential points of wooden bridge building are two; first, to season and prepare the wood so as to make it lasting; and secondly, to lay a proper and durable pavement on the top.

(286.) The following particulars should be attended to in seasoning the wood. The sudden decay of fir timber generally is owing to the sappy nature of its exterior surface, which is by no means capable of being remedied by any immediate application of paint previous to its being seasoned: on the contrary, it has been proved, that such an application is actually injurious, since it hinders the free admission of air and heat, which would have the property of extracting that sappy quality which so much contributes to decay and rottenness. In consequence of this practice, the sap strikes inwardly and makes its way to the heart of the wood, the substance of which is presently contaminated and destroyed.

(287.) As a means of preventing this evil, some scorch the timber over a flaming fire, turning it about till every side acquires a sort of crusty surface; and in doing this, it necessarily follows that the external moisture is dissipated. After this process, a mixture of pitch and tar, sprinkled with sand and powdered shells, may be advantageously applied to the parts under water. Those more in sight, after being well scorched, and while the wood is hot, should be rubbed over with linseed oil mixed with a little tar. This will strike deeply into the grain of the wood, and will soon harden so as to receive as many coats of paint as may appear necessary. It has been found that fir timber thus prepared is nearly equal to oak for durability.

(288.) With respect to the top of the bridge, and the formation of the pavement, the joists that lie on the beams at *a*, should be 9 inches scantling, and spaced about 18 inches apart, projecting out before the beam, and forming a kind of modillion. Upon these joists, six-inch planks should be laid, and brought forward so as to project before the ends of the joists, serving as a corona to the modillion, which, with the beam on which they rest, will form something like an entablature to the whole bridge.

(289.) This floor may be first covered with pitch and tar, and then with common slates; afterwards with one or two courses of brick set in with the best of mortar, and lastly, with the common paving work.

SECT. IV. OF HARBOURS.

(290.) The first thing to be considered is the situation; which may be some large creek or basin of water, in or near the place where the harbour is intended to be made, or at the entrance of a large river, or near the sea: for a harbour should never be dug entirely out of dry land, unless upon some extraordinary occasion, where it is impossible to do otherwise, and yet a harbour is absolutely necessary.

(291.) When a proper place is found, before it is fixed upon, it must be considered whether ships can lie there safe in stormy weather, especially when those winds blow which are most dangerous upon the coast; whether there be any hills, rising ground, or high buildings, that will cover it; in these cases, the situation is very proper: but if there be nothing already that will cover the ships, it must be observed whether any covering can be made at a moderate expence, otherwise it would be useless to build a harbour there.

(292.) The next thing to be considered is, whether there be a sufficient depth of water for large ships to enter with safety, and lie there without touching the ground; and if not, whether the terrace and inside might not be made deeper at a moderate expence: or, in case a sufficient depth of water is not to be had for large ships, whether the harbour would not be useful for small merchantmen; for such a one is often of great advantage, when situated upon a coast much frequented by small coasting vessels.

(293.) The form of the harbour must be determined in such a manner, that the ships which come in when it is stormy weather may lie safe, and so as there may be sufficient room for as many as pass that way: the depths of water where the walls are to be built must be taken at every 10, 15, or 20, feet distance, and marked upon piles driven here and there, in order that the workmen may be directed in laying the foundation.

(294.) It should next be considered what kind of materials are to be used, whether stone, brick, or wood. When stones are to be had at a moderate price, they ought to be preferred, because the work will be much stronger, more lasting, and need fewer repairs, than if made with any other materials: but when stones are scarce, and the expence becomes greater than what is allowed for building the harbour, the foundation may be made of stone as high as low-water mark, and the rest finished with brick. If this manner of building should still be too extensive, wood must be used; that is, piles driven as close as is thought necessary; which being fastened together by cross-bars, and covered with strong oaken planks, form a kind of coffer, which is filled with all kinds of stones, chalk, and shingles.

(295.) In laying the foundation, different depths of water, and various soils, require particular methods to be followed. When the water is very deep, the French throw in a great quantity of stones at random, so as to form a much larger mass than would be required upon dry land; this they continue to do within 3 or 4 feet of the surface of the water, where they lay the stones in a regular manner, till the foundation is raised above the

water: they then lay a great weight of stones upon it, and let it stand during the winter to settle; as well as to see whether it is firm, and resists the force of the waves and winds: after which they finish the superstructure with large stones in the usual manner.

(296.) As this method requires a great quantity of stones, it can be practised only in places where stones are in plenty; and therefore the following is much preferable. A coffer is made with dove-tail piles of about 30 yards long, and as wide as the thickness of the foundation is to be; then the ground is dug and levelled, and the wall is built with the best mortar. When the mortar is tolerably dry, those piles at the end of the wall are drawn out; the side-rows are continued to about 30 yards farther, and the end inclosed; then the foundation is cleared, and the stones laid as before.

(297.) But it must be observed, that the end of the foundation finished is left rough, in order that the part next to it may incorporate with it in a proper manner; but if it is not very dry, it will incline that way of itself, and bind with the mortar that is thrown in next to it: this method is continued till the whole pier is entirely finished. It must likewise be observed, that the piers are not made of one continued solid wall; because in deep water it would be too expensive: for which reason, two walls are built parallel to each other, and the interval between them is filled up with shingle, chalk, and stone. As these walls are in danger of being thrust out or overset, by the corps in the middle, together with the great weight laid at times on the pier, they are tied or bound together by cross-walls at every 30 or 40 yards distance, by which they support each other in a firm and strong manner.

(298.) Where there is great plenty of stones, piles may be driven in as deep as they will go, at about two or three feet distance; and when the foundation is sunk and levelled, large stones may be let down, which will bed themselves: but care must be taken to lay them close, and so as to have no two joints over each other; and when the wall is come within reach, the stones must be cramp together.

(299.) Another method practised, is to build in coffers much after the same manner as has been done in building the piers of Westminster bridge; (see § 271, 272.) but as in this case the ends of the coffers are left in the wall, and prevent their joining so well as to be water-tight, the water that penetrates through and enters into the corps may occasion the wall to burst and to tumble down. Another inconveniency arising from this manner of building is, that as there are but few places without worms, which will destroy wood wherever they can find it; by their means the water is let into the pier, and consequently makes the work liable to the same accident as has been mentioned above.

(300.) The best method to prevent these inconveniencies, is to take the wood away, and joggle the ends of the walls together with large stones, pouring tarras mortar into the joints; when this is done, the water between the two walls may be pumped out, and the void space filled up with

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- INDEX: A R C H I T E C T U R E.** 443
- of, 27—32, 102—167. Aquatic, 250—305.
- ARCHITRAVE**, origin of the, 25. defined, 103.
- ARCHIVOLTS** of bridges, dimensions of, 257.
- ARMORE**, a circular tower in, 57.
- ASSYRIAN** architecture improved after the taking of Jerusalem, 16.
- ASTRAGALS**, origin of, 25. etymology and definition of, 105. use of, 107.
- ATTRICS** defined, 173. origin, use and proportions of, ib. 174.
- AUZOUET**, M. his opinion of ancient columns, 110, 112.
- B**
- BABYLON**, vast extent of the walls of, 19. doubted by M. Goguet, ib. his reasoning related, ib. 20.
- BABYLONIAN** architecture, vast extent and strength of, 19.
- BALLUSTRADES**, use and proportions of, 212—214.
- BAND** defined, 105.
- BASEMENTS**, the proportions, height, and ornaments of, 177, 178.
- BALUS**, origin of, 9, 103.
- BAPTISTA**, LEON, censured, 112.
- BATAUDEAU**, explained, 270.
- BATTIS**, proportions of, for roofs, 215—218.
- BECTY**, intrinsic, 69. relative to of proportion, 74.
- BLIDORE**, M. his opinion of the dimensions of keystones, 257.
- BETOS**, composition of, 280. strength, 282.
- BISCOP**, Benedict, one of the reformers of architecture in England, 49, 51.
- BLONDEL**, M. his plan of diminishing columns, 114.
- BOUTZ** and Jachin correspond with the Doric order, 16.
- BREAKERS**, in harbours, construction of, 305.
- BRECHIN**, a circular tower in, 57. probable use of, ib.
- BRIDGES**, stone, erection of, 250—261. foundation of the piers, &c. of, 262—282. width of, 26. of Westminster, 271—274. Essex, 275, and Stockton, 276. Wooden, 283—289.
- BRITISH** architecture, history of, 4—65.
- BRITONS**, the ancient, lodged in caves, 43. and scattered dwellings, 45. instructed by the Romans in architecture, 46.
- BUILDINGS**, account of the most ancient, 4—20. of the erection of, in general, 226—249. principles to be observed in erecting, 226, 227. foundations of, 228—236. Walls, 237, 238. Chimneys, 239. roofs, 240. floors, 241, 242. apartments, 243—245. country seats, 246—249.
- C**
- CÆSAR**'s invasion, state of British architecture at the time of, 44, 45.
- CAIN**, the first builder on record, 4.
- CAPITALS**, origin of, 9, 24, 103, 105.
- CARACTACUS**, anecdote of, 46.
- CARYATIDES** defined, 179. origin and description of, 181. uses of, 182. and proportions, 183.
- CASTLES**, ancient Scots, description of, 54, 55. Welch, anciently built of wicker work, 52.
- CATHEDRALS** formerly built of wood, 49.
- CAVES**, the habitations of ancient Britons and Germans, 43.
- CAVETTO** defined, 105. its use, 107.
- CEILINGS**, directions respecting, 222—226. coved ceilings, 223. of gilding ditto, 224. and painting, 225.
- CHALAMINE**, castle, described, 54.
- CHAMBERS**, Sir W. his opinion of the precedence of the orders, 159.
- CHIMNEY-PIECES**, dimensions of, 200. ornaments of, 203.
- CHIMNEYS**, situations proper for, 201, 202. construction of, 239. how to prevent smoking, ib.
- CHINA**, an extraordinary bridge in, 253.
- CHINESE WALL**, extent of the, 19.
- CHONEL**, Castle, description of, 54.
- CIRCULAR TOWERS** described, 54—57.
- CIVIL** architecture defined, 2, 3.
- COFFER-DAMS** explained, 270. improved, 271, 272.
- COLORINO**, explained, 105.
- COLUMNS**, origin of, 9. defined, 102. diminution of, 109—117.
- COMPOSITE ORDER**, character of, 32, 156. remarks on it, 156, 157, 158. Sir W. Chambers's opinion of its rank, 159. its proportions, 160, 161.
- CORINTHIAN ORDER**, character of the, 31, 162. origin, use and proportions of the, 162—167.
- CORNICE**, origin of the, 9, 26, 103.
- CORONA**, derivation of, 105.
- COVERINGS** for roofs, 215.
- COUNTRY HOUSE**, plan of a, 243—245.
- COUNTRY SEAT**, plan of a gentleman's, 246—249.
- CYMA RECTA**, } etymology and
CYMATIUM, } definition of,
105. use of, 107.
- CYMA REVERSA**, defined, 105. use of it, 107.
- D**
- DADO** described, 103.
- DANUBE**, account of the famous bridge over the, 269.
- DAVID I.** king of Scots, a great builder, 58.
- DENTELES**, } origin of, 26. e-
DENTILS, } tymology of, 108.
- DIASTYLE**, definition of, 122.
- DIODORUS**, his description of ancient British huts, 44.
- DION CASSIUS**, his account of Trajan's bridge, 269.
- DITRIGLYPH** defined, 144.
- DOORS**, proportions of, 74. distinctions of, 191, 194.
- DORIC ORDER**, probably derived from the pillars in Solomon's temple, 16. character of the, 29, 133. origin, use, and proportions of, 133—140. names of its parts, 141, 142. its intercolumniations, 143—146. its arches, 147.
- DRAINS**, construction of, 233, 234.
- DROPS** described, 105.
- DURHAM** cathedral, Norman architecture in, 39.
- E**
- EARTH HOUSES**, ancient, described, 43.
- EGYPT**, ancient architecture of, 11, 18, 19.
- EGYPTIANS**, early cultivators of architecture, 11. grandeur of their buildings, 18. size of their rooms, &c. ib.
- ENTABLATURE** defined, 102.
- ERECTÆUS**, the temple of, at Athens, deficient of plinths, 22.
- ETRUSCANS**. See **TUSCANS**.
- EUSTYLE** defined, 122.
- F**
- FACIA** explained, 105.
- FILLETS**, origin of, 25; 105. use of, 107.
- FLOORS**, construction of, 241, 242.
- FOUNDATIONS** proper for buildings, 228, 229. directions respecting, 230—236. of foundation walls, 235, 236.
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ecture from the Greeks, 14. 33. or Etruscans, 15. it declines, 33. and becomes confused, ib. They instruct the Britons in architecture, 46.

ROMSEY church, a singular pillar in, 39.

ROOFS, construction of, 215,—221. coverings proper for, 215. proportions of beams, rafters, &c. 216—221.

ROOMS, proportions of, 75—80. figure of, 81.

RUSSIAN method of founding piers for bridges, 277, 278. ditto for harbours.

S.

SALISBURY, the cathedral of, date and stile of building, 61.

SARACENIC architecture, account of, 35. distinctive marks of, 40. instance of, 41.

SAXON architecture, described, 35, 36.

SCAMOZZI, Mr, his arrangement of the orders, 159. his methods of laying the foundations of piers, 265—268.

SANTLING, directions respecting, 218—221.

SCOTIA explained, 105.

SCOTLAND, ancient state of architecture in, 53, 57. improved by David I. 58.

SCOTTISH, ancient, buildings described, 54—57. probable uses of the circular towers, 57.

SEAT defined, 103.

SOLON's temple prior to the improvements in architecture

of other nations, 16. was probably imitated by Nebuchadnezzar, ib. its pillars correspond with the Doric order, ib.

STAIR-CASES, construction of, 204—207.

STATUES, how to place, 94. dimensions and proportions of, 195, 198. situation and arrangement of, 199.

STEEPLES, lofty, erected, 61.

STREETS described, 216.

SUSPAR described, 216.

SYSTYLE defined, 122.

T.

TASTE, false, in architecture, 100.

TELLVE castle, described, 54.

TEMPLE of Jerusalem. See SOLOMON.

TEMPLE OF PIETY, singularity in the structure of, 144.

TERMINI, origin and use of, 184.

TORUS, origin of the, 23. etymology of, 105. use of, 107.

TRAJAN's bridge described, 269.

TRIGLYPHS, origin of, 26. etymology of, 105.

TRITRIGLYPH, defined, 144.

TRODDAN, castle, described, 55.

TUSCAN ORDER, character of, 28. origin, use, &c. of, 118, —120. proportions of its arch, 131, 132.

TUSCANS supposed to have taught the Greeks architecture, 15.

TYMPAN, situation of the, 190.

V.

VASES, often absurdly placed, 94.

VITRUVIUS; his account of the origin of architecture, 6—10. writes obscurely on columns, 111.

VOLUTES explained, 106. of the Ionic order described, 152. manner of drawing, 153, 154. W.

WALES, sale of an ancient royal residence in, 52.

WALLS, foundation, how to lay, 235, 236. the thickness of, 237. and strength, 238.

WALLS of Babylon, vast height and extent of the, 19. dimensions of those of China, ib.

WELCH CASTLES, anciently built of wicker-work, 52.

WESTMINSTER bridge, method of building, 271, 272. remarks on it, 273. exhibits marks of decay, 274.

WIGWAMS, not probably the first kind of houses.

WILFRID, Bp. of York, a magnificent builder, and restorer of architecture, 49, 50.

WOODEN BRIDGES, erection of, 283—289.

WREN, Sir Christopher, his opinion of the modern Gothic architecture, 41. of Salisbury cathedral, 61.

Y.

YORK cathedral, anciently built of wood, 49.

Z.

ZEAL of the clergy tended to improve architecture, 58.

ARCHITECTURE, MILITARY, the art of building castles, forts, &c. See FORTIFICATION.

ARCHITECTURE, NAVAL, the art of building ships. See SHIP-BUILDING.

(1.) * ARCHITRAVE. *n. f.* [from *αρχη*, chief, and *τραβς*, Lat. a beam; because it is supposed to present the principal beam in timber buildings.] That part of the column, or order of a column, which lies immediately upon the capital, and is the next member of the entablature. This member is different in the different orders; and, in building architrave doors and windows, the workman frequently follows his own fancy. The architrave is sometimes called the reason piece, or master beam, in timber buildings, as porticos, cloysters, &c. In chimnies it is called the mantle-piece; and over jams of doors, and lintels of windows, hyperthyron. *Builder's Dict.* The materials laid over this pillar were of wood; through the lightness whereof the architrave could not suffer, nor the column itself, being so substantial. *Wotton's Architecture.*

Westward a pompous frontispiece appear'd,
On Dorick pillars of white marble rear'd,

Crown'd with an architrave of antique mold,
And sculpture rising on the roughen'd gold.

Pope.

(2.) ARCHITRAVE. See ARCHITECTURE, INDEX; and PLATE X.

ARCHITRAVE DOORS, are those which have an architrave on the jaumbs, and over the door upon the cap-piece, if straight; or on the arch, if the top be curved.

ARCHITRAVE WINDOWS, of timber, are commonly an ogee-raised out of the solid timber, with a list over it; though sometimes the mouldings are struck, and laid on; and sometimes cut in brick.

ARCHITRICLINUS, in antiquity, the master or director of a feast, charged with the order and economy of it, the covering and uncovering of the tables, the command of the servants, and the like. The architriclinus was sometimes called *servus tricliniarum*, and by the Greeks *εργαστης*, i. e. *præsumptor*, or *fore-taster*. Potter takes the architriclinus to signify also the same with the symposiarcha.

ARCHITYPE. See ARCHETYPE.

ARCHI-

(2.) **ARCHONS**, in modern history, divers officers, both civil and religious, under the Greek emperors. Thus bishops were sometimes called *archontes*; as well as the lords of the emperor's court. We also read of the archon of the antimen-
sa, archon of archons, grand archon, archon of churches, archon of the gospel, archon of the walls, &c.

ARCHONTICI, } in church history, a branch
ARCHONTICS, } of Valentinians, who main-
tained that the world was not created by God,
but by angels called *Archontes*, or Arch-angels.
They also denied the resurrection, and said that
the Devil begat Cain and Abel upon Eve, &c.

ARCHONTIUM, [*αρχοντιον*] denotes a dignity
of the Greek church. See **ARCHONS**, No. 2.

* **ARCH-PHILOSOPHER**. *n. f.* [from *arch*
and *philosopher*.] Chief philosopher.—It is no im-
probable opinion therefore, which the *arch-philoso-*
pher was of, that the chiefest person in every
household was always as it were a king. *Hooker*, b. i.

ARCH-PIRATE, the head of a set of pirates.
Bailey.

* **ARCH-PRELATE**. *n. f.* [from *arch* and *pre-*
late.] Chief prelate.—May we not wonder, that
a man of St Basil's authority and quality, an *arch-*
prelate in the house of God, should have his name
and wide called in question. *Hooker*, b. v. § 12.

* **ARCH-PRESBYTER**. *n. f.* [from *arch* and
presbyter.] Chief presbyter.—As simple deacons
are in subjection to presbyters, according to the
anon law; so are also presbyters and *arch-pres-*
byters in subjection to these archdeacons. *Ayliffe's*
Parergon.

(1.) * **ARCH-PRIEST**. *n. f.* [from *arch* and
priest.] Chief priest.—The word decanus was ex-
tended to an ecclesiastical dignity, which included
the *arch-priests*. *Ayliffe's Parergon*.

(2.) **ARCH-PRIEST**, or **ARCH-PRESBYTER**, was
anciently the first person after the bishop; he
was seated in the church next after the bishop;
and even acted as his vicar in his absence, as to all
spiritual concerns. In the 6th century, there were
found several arch-priests in the same diocese;
from which time, some will have them to be call-
ed *deans*. In the ninth century, they distinguish-
ed two kinds of cures or parishes: the smaller go-
vern'd by simple priests; and the baptismal chur-
ches by arch-priests; who, beside the immediate
concern of the cure, had the inspection of the o-
ther inferior priests, and gave an account of them
to the bishop, who governed the chief, or cathed-
ral church, in person. There are archpresbyters
still subsisting in the Greek church; vested with
most of the functions and privileges of chorepis-
cops or rural deans.

ARCH-PRIOR was a name sometimes given to
the master of the order of Templars.

ARCH-STONE. See **KEY-STONE**, and **VOUS-**
SOIR.

ARCH-SUBDEACON, **ARCHISUBDIACONUS**,
the chief among the subdeacons, as the archdea-
con is among the deacons. In some copies of the
Roman Ordinal, he is called *archisubdiaconus*.

ARCHITELIN, a corn measure of Rotterdam,
containing 3 pecks, 5 quarts, and about a pint.

ARCH-TREASURER, the great treasurer of
the German empire. This office was created with

the 8th electorate, in favour of the elector Pala-
tine, who had lost his former electorate, which
was given to the duke of Bavaria, by the emper-
or Ferdinand II. who took it away from Frederic
V. elector Palatine, after the battle of Prague,
where he was defeated in maintaining his election
to the crown of Bohemia. The dignity of arch-
treasurer was afterwards contested, but was at last
settled upon the elector of Hanover; who claim-
ed it in virtue of his descent from Frederic elector
Palatine. Accordingly, his majesty the king of
Great Britain bears the title; which is thus con-
tracted upon his coin; S. R. I. A. T. E. T. E. *i. e.*
Sacri Romani Imperii Archi-Thesaurus et Elector;
or arch treasurer and elector of the Holy Roman
empire.

* **ARCHWISE**. *adv.* [from *arch* and *wise*.] In
the form of an arch.—The court of arches, so
called *ab arcuata ecclesia*, or from Bow Church,
by reason of the steeple or clochier thereof, raised
at the top with stone pillars, in fashion of a bow
bent *archwise*. *Ayliffe's Parergon*.

ARCHYTAS of Tarentum, a philosopher of
the Pythagorean sect, and famous for being the
master of Plato, Eudoxas, and Philolaus, lived a-
bout A. A. C. 408. He was an excellent mathe-
matician, particularly in that part of the science
which regards mechanics: he is said to have
made a wooden pigeon, that could fly, and to
be the first that brought down mathematics to
common uses. He is said to be the inventor of
the ten catagories. He asserted, that God was
the beginning, the supporter, and the end, of all
things. There are two epistles preserved in Dio-
genes Laertius, one from Archytas to Plato, and
another from Plato to Archytas. He acquired
great reputation in his legislative capacity. He
likewise commanded the army 7 times, and was
never defeated; but was at last cast away in the
Adriatic Sea, and thrown upon the coast of A-
pulia.

ARCIGOVINA, a duchy of Dalmatia.

ARCILEUTO, **ARCHILUTE**, a long and large
lute, having its bass strings lengthened after the
manner of the theorbo, and each row doubled;
either with a little octave or an unison. It is used
by the Italians for playing a thorough bass.

AKCION, in botany, a name given by some of
the ancient writers on medicine, to the plant we
call tusilago, or colt's foot.

ARCIS-SUR-AUBE, a small town of France,
seated on the river, and in the department of
Aube. Long. 4. 12. E. Lat. 48. 32. N.

* **ARCITENENT**. *adj.* [*arcitenens*, Lat.] Bow
bearing. *Dict*.

ARCIVÆ AVES, in antiquity, birds which gave
bad omens, either by their flight, noise, or man-
ner of eating. They were called *arcivæ*, some-
times also *arcule*, *quia arcebant ne quid fieret*, pre-
vented or forbad things being done.

ARCK. See **ARC**, No. 3.

ARCLID, a village in Cheshire, near Norwich.

ARCO, a strong town and castle in the Tren-
tin, belonging to the house of Austria. It was
taken by the French in 1703, and abandoned soon
after. It stands on the river Sarca, near the nor-
thern extremity of the Lake Garda, 16 miles S.
W. of Trent. Long. 11. 12. E. Lat. 46. 0. N.

(1.) **ARCOLE**,

(1.) **ARCOLE**, a village of Pullid in Shropshire, 3 miles S. W. of Hinstock.

(2.) **ARCOLE**, or **ARKHUL**, a village 4 miles from Shrewsbury, called also **HIGH ERCAL**.

ARCONA, a strong town situated on the island of Rugen in the Baltic. It stood on a high promontory, with the east, north, and south sides defended by steep and lofty precipices, and the west by a wall fifty feet high, proportionably thick, and secured by a deep and broad ditch.—It was, however, taken and ruined, in 1168, by Valdemar king of Denmark. One of the conditions imposed by the conqueror was, that the inhabitants should destroy a temple they had erected to St Vitus, and deliver up the vast treasure belonging to this tutelary saint. Another was, that they should pay 40 silver yokes for oxen, by way of tribute, and enter as soldiers in the Danish service, when called upon.

ARCOP, a village in Herefordshire.

ARCOS, a strong city of Andalusia, in Spain, seated on a high craggy rock, at the bottom of which runs the Gaudeleto; 28 miles N. E. of Cadiz. Its strength lies not only in its situation, but in the works erected for its defence, and it is inaccessible on every side but one. The governor resides in an old castle, from whence there is a delightful prospect, which extends very far into the neighbouring country. Long. 5. 46. W. Lat. 36. 52. N.

ARCOT, a large city of Indostan, 73 miles from Madras, and 217 from Seringapatam. It is the capital of the Carnatic, and is governed by a Nabob. Long. 79. 0. E. Lat. 12. 30. N.

ARCOY, a town of France, in the department of Yonne, in which there is a magazine of salt.

ARCTAPELIOTES, in cosmography, the wind which blows at the 45° from N. to E. It is the same with what we call the N. E. wind.

ARCTATIO, or **ARCTITUDO**, a straitness of the intestines, contipated from inflammation: also a preternatural straitness of the *muliebri pudendum*, or *uterus*.

* **ARCTATION**. *n. f.* [from *arcto*, to straighten. Strengthening; confinement to a narrower compass.

(1.) **ARCTIC**, in astronomy, an epithet given to the north pole, or the pole raised above our horizon.] It is called the *arctic pole*, on occasion of the constellation of the little bear, in Greek called *αρκτος*; the last star in the tail whereof nearly points out the north pole.

(2.) * **ARCTICK**. *n. f.* [from *ἄρκτος*, the northern constellation.] Northern; lying under the *Arctos*, or bear. See **ARTICK**.—

Ever during snows, perpetual shades

Of darkness would congeal their livid blood,

Did not the *arctick* tract spontaneous yield

A cheering purple berry big with wine. *Philips*.

(1.) **ARCTIC CIRCLE** is a lesser circle of the sphere, parallel to the equator, and 23° 30' distant from the north pole: from whence its name. This, and its opposite, the *antarctic*, are called the two *polar circles*; and may be conceived to be described by the motion of the poles of the ecliptic, round the poles of the equator, or of the world.

(2.) * **ARCTICK CIRCLE**. The circle at which the northern frigid zone begins.

ARCTITUDO. See **ARCTATIO**.

ARCTIUM, **BURDOCK**: A genus of the polygamia order, belonging to the syngenesia class of plants; and in the natural method ranking under the 49th order, *Compositæ-capitatæ*: The calyx is globular; with scales having hooks reflected at the tops. There are 3 species, viz.

1. **ARCTIUM LAPPA**,

2. **ARCTIUM PERSONATA**, and

3. **ARCTIUM TOMENTOSUM**.

} They are all troublesome weeds; to

require no direction for their culture. The tender stems of the lappa, or common burdock, however, deprived of the bark, may be boiled and eat like 'sparagus. When raw, they are good with oil and vinegar. Boys catch bats, by throwing the prickly heads of this species into the air. Cows and goats eat this herb; sheep and horse refuse it; swine are not fond of it. The seeds, which have a bitterish subacid taste, are recommended, as very efficacious diuretics, given either in the form of emulsion, or in powder, to the quantity of a dram. The roots, which taste sweetish, with a slight austerity and bitterishness, are esteemed aperient, diuretic, and sadorific, and said to act without irritation, so as to be freely ventured upon in acute disorders.

ARCTOMYS PALESTINORUM, in zoology, the name of an animal of the rat kind, but very large, being of a middle size between the rat and the rabbit: it lives in caves, and feeds on vegetables, and is a fierce and bold creature. It uses its fore feet as hands, and has a custom of sitting on its buttocks, and in this posture looks very like a bear.

ARCTOPHYLAX, [from *ἄρκτος*, bear, and *φυλάξω*, I guard,] in astronomy, a constellation otherwise called *Bootes*.

ARCTOPUS, in botany, a genus of the polygamia diœcia class; and in the natural method ranking under the 45th order, *Umbellatæ*. The umbella of the male is compound; the involucrum consists of five leaves; the corolla has six petals; the stamina are five; and two pistils. The umbella of the hermaphrodite is simple: the involucrum is divided into 4 parts, is spinous, large, and contains many male flowers in the disk. There is but one species of *arctopus*, viz.

ARCTOPUS ECHINATUS, a native of Ethiopia.

ARCTOTHECA ANEMOSPERMOS. See next article.

ARCTOTIS, in botany: A genus of the polygamia necessaria order, belonging to the syngenesia class of plants; and in the natural method ranking under the 49th order, *Compositæ-discides*. The receptacle is bristly; the corona of the pappus is pentaphyllous; and the calyx is imbricated with scales loose at the top. It is commonly called *anemospermus*, from the resemblance of its seeds to those of the anemone. There are 11 species; natives of Ethiopia, or the Cape of Good Hope. Of these,

1. **ARCTOTIS ANGUSTIFOLIA**, with spear shaped leaves, and,

2. **ARCTOTIS ASPERA**, with wing shaped woody leaves, are most remarkable for their beauty, having

having rays of a fine yellow or deep gold colour. They flower in May and June. All the species of *arctotis* may be propagated by cuttings; which should be frequently renewed, as the old plants are subject to decay in winter. They may be planted in any of the summer months, in a bed of light fresh earth; observing to shade them from the sun until they have taken root. They should be exposed to the open air until the latter end of October, or longer, if the weather is favourable, when they must be removed into the green house.

ARCTURUM INFRA, a small star of the 7th or 8th magnitude, to the south of *arcturus*, observed by Mr Flamsteed, and so named by him.—Its place is not determined in the British Catalogue.

ARCTURUS, in astronomy, a fixed star, of the first magnitude, in the constellation of *Arctophylax*, or *Bootes*. The word is formed of *arctos*, bear, and *ura*, tail; q. d. *bear's tail*, as being very near it. This star was known to the ancients, and is mentioned by Job, as well as by Virgil. Mr Hornsby concludes, that *arcturus* is the nearest star to our system, visible in the northern hemisphere, because the variation of its place, in consequence of a proper motion of its own, is more remarkable than that of any other of the stars; and by comparing a variety of observations respecting both the quantity and direction of the motion of this star, he infers that the obliquity of the ecliptic decreases at the rate of 38" in 100 years; a quantity which nearly corresponds to the mean of the computation framed by Mr Euler and M de la Lande, upon the principles of attraction.

ARCTUS, [*αρκτος*], in astronomy, a name given by the Greeks to two constellations of the northern hemisphere; by the Latins called *ursa major* and *minor*, and by us the Greater and Lesser Bear.

ARCUALIA ossa, in anatomy, a name used by some for the *ossa synipitis*, by others for the *ossa temporum*.

ARCUALIS sutura, among surgeons, denotes the coronal future.

ARCUARIUS, an archer.

* **ARCUATE**. *adj.* [*arcuatus*, Lat.] Bent in the form of an arch.—The cause of the confusion in sounds, and the inconfusion of species visible, is, that the sight worketh in right lines; but sounds that move in oblique and *arcuate* lines, must needs encounter and disturb the one the other. *Bacon's Nat. Hist.*—In the gullet, where it perforateth the midriff, the carneous fibres are indented and *arcuate*. *Ray on Creation*.

* **ARCUATILE**. *adj.* [from *arcuate*.] Bent; indented. *DiB.*

(1.) * **ARCUATION**. *n. f.* [from *arcuate*.] 1. The act of bending any thing; incurvation. 2. The state of being bent; curvity or crookedness. [In gardening.] The method of raising by layers such trees as cannot be raised from seed, or that bear no seed, as the elm, lime, alder, willow; and is so called from bending down to the ground the branches which spring from the offsets or stools after they are planted. *Chambers*.

(2.) **ARCUATION, METHOD OF PERFORMING**. Strong mother plants or stools must be planted in a clear border, and in a straight line, about six

feet asunder. When these have shot five or six main branches from the root, and as many collateral branches, the former must be bent to the ground, and there fastened. The small branches must be covered 3 inches deep upon the joints, and have a large basin of earth made round them to hold the water. About the middle of September they may be opened, and if they have taken root, may be immediately removed into the nursery; but if they have not sufficiently extended their roots, they must be suffered to remain till the spring, and then transplanted.

(3.) **ARCUATION**, [from *arcus*, a bow,] is used in surgery, for an incurvation of the bones; such as we see in the case of rickets, &c.

* **ARCUATURE**. *n. f.* [*arcuatura*, low Latin.] The bending or curvature of an arch. *DiB.*

ARCUBALISTA, in the military art, a kind of balista, probably made after the fashion of a bow. It is mentioned by Vegetius; but the description of it omitted by him, as too well known then, though now hard to be guessed at.

ARCUBALISTARII, or **MANUBALISTARII**, archers who fought with the *Arcubalista*.

* **ARCUBALISTER**. *n. f.* [from *arcus*, a bow, and *balista*, an engine.] A cross-bow man,—King John was espied by a very good *arcubalister*, who said, that he would soon dispatch the cruel tyrant. God forbid, vile varlet, quoth the earl, that we should procure the death of the holy one of God. *Camden's Remains*.

ARCUCCIO, { a machine made of a board covered with pieces of hoops, like the tilt of a waggon; used in Italy to prevent children from being overlaid and smothered by nurses or others. Every nurse in Florence is obliged to lay her child in an *arcutio*, under pain of excommunication.

ARCUTIO, }

(1.) * **ARD**. [Saxon.] Signifies natural disposition; as, *Goddard* is a divine temper; *Reinard*, a sincere temper; *Giffard*, a bountiful and liberal disposition; *Bernard*, filial affection. *Gibson's Camden*.

(2.) **ARD**. Mr Bailey observes that this Saxon, or Teutonic word, makes a termination of several common English words, where it signifies quality: such as *drunkard*, *dotard*, &c.

(3.) **ARD**, the youngest son of Benjamin.

ARDA, an insect of **ARABIA**. See § 11.

ARDAGH, two small towns of Ireland, viz. 1. in the county of Limerick, near Rathkeale: 2. in the county of Longford.

ARDAMA, or } [from *ardam*, to water,] in an-

ARDAMON, } tiquity, a vessel of water placed at the door of a person deceased, till the time of burial, as a token that the family was in mourning, and to serve to sprinkle and purify persons as they came out of the house.

ARDARAGH, a village of Ireland, in the county of Donegal.

ARDARGIE, a village of Scotland, in the parish of Forgardenny, in Perth-shire, seated on the Ochil hills, and containing about 18 farm houses. There is a place near it called the *Roman Camp*, of a square form, about 90 yards every way, defended, on one side, by a deep hollow, through which runs a rivulet; and on the other 3 by trenches, of 10 yards wide at the top and 14 feet deep.

ARDASSES, in commerce, the coarsest of all the silks of Persia; and as it were the refuse of each kind. In this sense, they say, the *legis*, the *bousets*, the *choufs*, and the *payas arinfes*, to signify the worst of those four sorts of Persian silks.

ARDASSINES, in commerce, called in France *ablaques*; a very fine sort of Persian silk, little inferior in fineness to the *sourbaffis* or rather *cherbaffis*, and yet it is little used in the silk manufactures of Lyons and Tours, because that kind of silk will not bear hot water in the winding.

ARDBRACCAN, a small town of Ireland in the county of Meath, 3 miles W. of Navan, and 25 N. W. of Dublin. Long. 7. 0. W. Lat. 53. 40. N.

ARDBURY, or **ERDBURY**, a village in Warwickshire near Coventry.

ARDCHATTAN, a parish of Scotland, in the county of Argyle, united to that of Muckairn; and formerly the residence of St Bede, the walls of whose church still remain entire. These united parishes extend 24 Scots miles, (or 36 English,) in length, and about 20 in breadth; and contained, in 1792, about 2350 inhabitants, according to Mr Lud. Grant's report to Sir John Sinclair. The climate is healthy, as an evidence of which Mr Grant mentions one man who died, aged 105, one living turned of 100, and other 3 on the verge of that great age. In the monastery of Ardchattan, the ruins of which still remain, a parliament was held by king Robert Bruce, after his defeats at Methven and Dalrie; and it is said the debates were carried on in the Celtic language, which is still the common language of the people.

ARDCLAGH, a parish of Scotland, in the extremity of the shire and lying S. E. of the town of Nairne; about 11 miles long, and nearly 8 broad, containing about 2000 acres of arable land, and 4000 of moss and moor. The climate is good, but the soil poor. It produces, however, as much oats, bear, rye, and potatoes, as serves the inhabitants; the number of whom, by Mr Mitchell's report to Sir J. Sinclair, in 1792, was 1186.—Their principal manufactures are plaidens, coarse tartans, broad cloths and duffles. The hills and woods abound with hares, foxes, deers, moor fowl, partridges, otters, &c. There are 300 horses, 1000 black cattle, and 2000 sheep in the parish.

(I.) **ARDEA**, in ancient geography, a town of Latium, the royal residence of Turnus king of the Rutuli; so called, either from the augury of the heron, or from the excessive heat of the country. It was a marshy, sickly situation. Virgil says, it was built by Danaë, the mother of Perseus, it lay about 5 miles distant from the sea, and 20 from Rome; and was a Roman colony. It is now a village in the Campagna di Roma. Long. 17. 49. E. Lat. 41. 30. N.

(II.) **ARDEA**, in ornithology, a genus of the order of Grallæ. The general characters of this order are these: the bill is straight, sharp, long, and somewhat compressed, with a furrow that runs from the nostrils towards the point; the nostrils are linear; and the feet have four toes. Under this genus Linnæus comprehends the grus or crane, the ciconia or stork, and the ardea or heron, of

other authors. There are 79 species, of which the following are the most remarkable.

1. **ARDEA AMERICANA**, or hooping crane of Edwards, is a native of America. See Plate XIV. The crown of the head and temples are naked and papillous; the forehead, nape of the neck, and prime wing feathers, are black; but the body is white: The under part of the head, as far as the lower chap, is red; the beak is yellowish, and jagged at the point; the feet are red, and the prime tail-feathers white. This species is often seen at the mouths of the Savanna, Aratamaha, and other rivers near St Augustine: in spring going north to breed, like the common crane, and returning, like that bird, to the south in autumn. In summer they are found in Hudson's Bay, where they arrive in May, and retire in September; and are chiefly met with in unfrequented places, in the neighbourhood of lakes, where they breed. The nest is made on the ground, composed of grass and feathers. They lay two white eggs, like those of the swan, and sit 20 days; the young are at first yellow, changing to white by degrees. These birds have a long loud note, which may be heard at a great distance: their food is chiefly worms and insects, which they search for at the bottom of ponds. The natives of Hudson's Bay call this species *Waptaw-uchebauk*.

2. **ARDEA ARGIL**, or **HURGIL**, of Ives, is a very large species; from tip to tip of the wings measuring 14 feet 10 inches; and from the tip of the bill to the claws 7 feet and a half: the bill is 16 inches round at the base, of different colours, and nearly of a triangular shape; the feathers of the back and wings are very strong, and of an iron colour; those of the breast long: over the belly a great deal of down, of a dirty white: the legs and half the thighs are naked; the naked parts full 3 feet in length. This monster, as Ives terms it, inhabits Bengal, and is also found at Calcutta; at the last place called *Hurgil*. It majestically stalks along before one, and appears at first like a naked Indian. The common opinion is, that the young of the Bramins possess these birds. On opening one of these, a terapin, or land tortoise, 10 inches long, was found in its craw, and a large male black cat was found entire in its stomach. In Sumatra there is said to be a great variety of the stork kind; some of a prodigious size, and otherwise curious; as the *Boorong Cambing*, and *Booringoolar*, &c. The same species seems to have been remarked by Mr Smeathman in Africa, who resided there; an adult of one of which will often measure 7 feet when standing erect. He describes the plumage much the same as in Mr Ives's bird; adding, that the gape is monstrously wide: the head is covered with white down, thinly dispersed, appearing not unlike a greyheaded man: on the middle of the neck before, a long conic membrane, like a bladder, sprinkled very thick with short down, rising or falling as the animal moves the beak, and always appearing inflated. These birds are met with in companies. When seen at a distance, near the mouths of rivers, coming towards an observer, which they do with the wings extended, they may well be taken for canoes, upon the surface of a smooth sea: when

on the sand banks, for men and women picking up shell fish or other things on the beach. One of these, a young bird, about five feet in height, was brought up tame, and presented to the chief of the Bananas, where Mr Smeathman lived; and being accustomed to be fed in the great hall, soon became familiar; duly attending that place at dinner time, and placing itself behind its master's chair, frequently before any of the guests entered. The servants were obliged to watch it narrowly, and defend the provisions with switches in their hands; but, notwithstanding this, it would frequently snatch off somewhat, and it once purloined a whole boiled fowl, which it swallowed in an instant. Its courage is not equal to its voracity; for a child of 8 or ten years old soon puts it to flight with a switch, though at first it seems to stand upon its defence, by threatening with its enormous bill widely extended, and crying out with a loud hoarse voice like a bear or tiger. It is an enemy to small quadrupeds, as well as birds and reptiles, and destroys fowls and chickens, though it dare not attack a hen with her young openly: it preys also on rats, young kittens, and the like; and has been known to swallow a cat whole: a bone of a ship of beef being broken asunder serves it but for two morsels. The individual above-mentioned used to fly about the island, and roost very high among the silk-cotton trees; from whence, at 2 or 3 miles distance, it could be seen the dinner carrying across the yard; when, starting from its station, it would enter promiscuously with the women who carried in the dishes. When sitting, it was observed to rest itself on the whole length of the hind part of the leg. It sometimes stood near, for half an hour after dinner, with the head turning alternately, as if listening to the conversation; and during this time would every 3 or 4 minutes void the excrements, which were liquid and whitish; and took care always to do this on his legs, by wheeling the back parts round over one or the other, and this regularly on different legs; for if he had mired on the left last, he would be sure to do the same on the right the next time, never making any mistake.

3. ARDEA CICONIA, or white stork of Ray, has red eye-balls, and black prime wing-feathers. The skin below the feathers, as also the beak, feet, and claws, are of a blood colour. It is a native of Europe, Asia, and Africa; but is seldom or never to be met with in Italy. The ciconia feeds upon amphibious animals. It is such an enemy to serpents, that it is reckoned almost a crime to kill a stork. From this favourable treatment, they are seen in Holland and the Low Countries walking unconcerned in the middle of the streets. Storks are birds of passage; they spend the summer in Europe, go off to Egypt, Ethiopia, &c. all at once before winter, and do not return till about the middle of March.

4. ARDEA GARZETTA, or egret, is crested behind; the body is white, the beak black, and the feet greenish. It is a most elegant bird. It weighs about one pound; and the length is 24 inches, to the end of the legs 32. It is a native of the east. But that formerly it was very frequent in Britain, appears by some of the old bills of fare: in the famous feast of Archbishop Neville, we find no

less than 1000 afterides, egrets or egrittes, as it is differently spelt. Perhaps the esteem they were in as a delicacy during those days occasioned their extirpation in our islands: abroad they are still common, especially in the southern parts of Europe, where they appear in flocks. The scapulars and the crest were formerly much esteemed as ornaments for caps and head-pieces; so that aigrette and egret came to signify any ornament to a cap, though originally the word was derived from *agrec*, *a cause de l'agreur de sa voix*.

5. ARDEA GRUS, or common crane of English authors, has a naked papillous crown; the prime feathers of the wings are black; the body is ash coloured; the prime feathers of the tail are ragged. This species is far spread, being met with in great flocks throughout northern Europe and Asia; in Sweden, throughout Russia, and Siberia as far as the river Anadyr, migrating even to the arctic circle. In Kamtschatka they are only seen on the southern promontory: are migratory, returning northward to breed in spring, and generally choosing the same places which had been occupied by them the season before. In winter they inhabit the warmer regions, such as Egypt, Aleppo, India, &c. they are also met with at the Cape of Good Hope, changing place with the season. In their migrations they frequently fly so high as not to be visible; their passing only being known by the noise they make, which is louder than any other bird. In France they are seen in spring and autumn; but for the most part are mere passengers.—This species seems to have been formerly a native of Britain; as we find in Willoughby, p. 52. that there was a penalty of 20*d*. for destroying one of their eggs; and Mr Ray informs us, that in his time they were found during the winter in large flocks in Lincoln-shire and Cambridge-shire: but at present the inhabitants of those counties are scarcely acquainted with them; so that these birds seem now to have forsaken our island. We are told that they make their nests in the marshes, and lay two bluish eggs. The young birds are thought very good food. They feed on reptiles of all kinds, as well as on green corn, which last they make such havock of as to ruin the farmers wherever flocks of them alight.

6. ARDEA HERODIAS, or CRISTATA MAXIMA of Catesby, is crested behind, has a dusky-coloured back, reddish thighs, and the breast speckled with oblong black spots. It is 4 feet and a half when erect; the bill is about 8 inches from the angle of the mouth to the end of it; and the crest is made up of long, narrow, brown feathers, the longest being 5 inches in length, which it can erect and let fall at pleasure. It is a native of Virginia, and feeds not only upon fish and frogs, but on lizards, efts, &c. See Plate XIV.

7. ARDEA LEUCOGERANOS of Pallas, or the Siberian crane of Pennant, is four and a half feet when standing erect. The bill is of a red colour; the irides are white: the plumage is white as snow, except the 10 first greater quills, with the coverts of them, which are black: the legs are long and red. This species inhabits the vast marshes and lakes in Siberia, especially those about the Ischim, and along the rivers Ob and Irtysh. It makes its nest among the reeds, seldom accessible by

hang in an elegant manner: the quills and tail are black at the ends; the legs black. This species is found in many parts of Africa and Asia, where they frequent marshes and the neighbourhood of rivers, as their food is fish, like most of the heron genus. It is frequently kept in menageries, being endowed with great gentleness of manners, added to its being an elegant bird. At various times it puts itself into strange and uncouth attitudes, especially those which imitate dancing; and Keyser mentions one in the Great Duke's gallery, at Florence, which had been taught to dance to a certain tune, when played or sung to it. The name this bird is known by in the east is *kurki*, or *querky*. Sometimes it will breed in confinement: one is recorded to have lived 24 years at Versailles, where it had been bred.

ARDEATES, the natives of ARDEA. See N° I.

ARDEATH, a village of Ireland, in the county of Meath.

ARDEBIL, or ARDEVIL, a town of Persia, in the province of Aderbijan. It was taken and burnt by Jenghiz Khan in 1222, when most of the inhabitants were destroyed by that monster, but it has been since rebuilt; and is still ranked for dignity among the best cities of the kingdom, on account of its having been the residence and burying place of some of the Persian kings; particularly the sepulchre of Sheik Sefi is at this place, in which the people resort in pilgrimage. His memory indeed deserves to be honoured; for he founded a place, which they call his *kitchen*, with a revenue sufficient to maintain 1000 poor people, and to feed them three times a-day. Three or four of the largest principal streets have shops, and are planted on each side with elm and linden trees, to keep off the excessive heat of the sun; but the houses are poorly built, with bricks dried in the sun: yet most of them, that are not in the bazars or market places, have the pleasure and convenience of a garden full of trees bearing fruit; and there are large spots in the out parts of the town, where the houses are at a distance from each other, and the spaces between planted with trees, which render the city of a large extent. The melian, or great square, is 300 paces long, and 150 broad, having shops all round; which, when this place was in a flourishing condition, were stored with all manner of valuable commodities. Through the city, two branches of a rivulet pass, which have been sometimes so much swelled by the melting of the snow on the mountains, that it required canals to carry off the stream. In the reign of Shah Abbas, it broke down the dykes, and carried away a great number of houses. The city is without walls, and is seated in the midst of a large plain encompassed with mountains, the highest of which lies westward, and is always covered with snow. These render the air sometimes extremely hot, and at others intolerably cold, which occasion epidemical distempers, that carry off great numbers of people. The soil produces no fruit near the city but apples, pears, and peaches; and yet is good for both corn and pasture. The sheep are so numerous, that 100,000 have passed over the city bridge in a day. There are here several sorts of mineral waters, which serve both for common bathing, and for the cure of various diseases; one

of these is a sulphurous spring, whose exhalations render the circumambient air extremely disagreeable. There are 3 springs which produce as hot water as if it was boiling, and from which waters are conveyed to the public baths in the city. About half a league from the city, on the right hand of the public road, there is a pool of standing water, which is covered all over with salt like ice. Ardebil is situated about 25 or 30 miles E. of Tauris. Long. 48. 20. E. Lat. 38. 15. N. according to Walker; but others place it in Long. 46. 6. E. and Lat. 36. 5. N.

(1.) ARDECHE, a department of France; bounded on the E. by that of Drome; on the S. by Gard; on the W. by Lozere, and on the N. by Upper Loire; and so named from

(2.) ARDECHE, a river of France, which falls into the Rhone.

ARDEE, or ATHERDEE, a town of Ireland, in the county of Louth, 34 miles N. W. of Dublin. It has a mount called *Castle-Guard* nearly 90 feet high, which seem to have been an artificial work. The main trench is between 30 and 40 feet deep: the circumference at the top is about 140; and round the foundation it is upwards of 600. Some suppose it to have been a sepulchral monument or royal burying place; others that it was a place of assembly, for the people to debate on public affairs.

(1.) ARDEN, a common name of forests among the ancient Celtæ, from the widely extensive one which ranged for 500 miles in length across the country of Gaul, or covered more than half the county of Warwick in Britain, and the sites of which still retain the appellation of Arden, to the much smaller one of the ancient Mancenion, that covered and surrounded the cite of the present Manchester. It was written *Arduen* by Cæsar and Tacitus in speaking of the forest in Gaul, as well as by Ossian, who only changes the *u* into *v*, in mentioning the woods of Caledonia. It cannot (says Mr Whitaker) be compounded of *ar* the prepositive article in Celtic, and the substantive *den*, as Baxter and Camden assert it to be; but is formed of *ard* an adjective, and *uen* the same as *den*. The meaning of the name therefore is not, as Mr Baxter renders it, simply *the hills*, or even, as the ingenious translator of Ossian interprets it, *the high hill*. *Ard* signifies either *high* or *great*, and *uen* or *den* either an *hill* or *wood*. *Arduen*, *Arduen*, or *Arden*, then, means a considerable wood. Thus the name became applicable to such sites as the *plains* of Warwickshire and the *bills* of Scotland: and it was given, not only to the most extensive forests, to that which was the greatest in Gaul, or so considerable in Britain; but to many that were important only within their own contracted districts, as the wood of Mancenion abovementioned, and others.

(2.) ARDEN, a village in Yorkshire, near Thirsk.

ARDENBURG, a town of the Netherlands, in Dutch Flanders, 10 miles N. E. of Bruges, and formerly the most considerable in that country. It now belongs to the French. Long. 3. 30. E. Lat. 51. 16. N.

* ARDENCY. *n. f.* [from *ardent*.] Ardour; eagerness; warmth of affection.—Accepted our prayers shall be, if qualified with humility, and
ardency

ardency, and perseverance, so far as concerns the end immediate to them. *Hammond's Pract. Catechism*.—The ineffable happiness of our dear Redeemer must needs bring an increase to ours, commensurate to the *ardency* of our love for him. *Boyle*.

(1.) ARDENNES, a department of France, bounded by those of Aisne on the W. Marne on the S. and Meuse on the E. and so named from

(2.) ARDENNES, a forest in France, formerly of vast extent; but the trees are in many places grubbed up, and where they stood are built cities, towns, and abbeys. At present it extends from Thionville, near the country of Liege, to Donchery and Sedan, on the confines of Champagne. The roads are so narrow in some places, that two waggoners cannot pass each other; and therefore the waggoners are obliged to provide themselves with bells or horns to give one another notice to stop in time.

ARDENORA, a village in Cornwall, between Grampound, and Lestwithiel.

ARDENSIDE, a village in Yorkshire, near Arden.

* ARDENT. *adj.* [*ardens*, Lat. burning.] 1. Hot; burning; fiery.—Chymists observe, that vegetables, as, lavender, rue, marjoram, &c. distilled before fermentation, yield oils without any burning spirits; but, after fermentation, yield *ardent* spirits without oils; which shews, that their oil is, by fermentation, converted into spirit. *Newton's Opticks*. 2. Fierce; vehement, having the appearance or quality of fire.—

A knight of swarthy face,

High on a coal-black steed pursued the chase;
With flashing flames his *ardent* eyes were filled.

Dryden.

3. Passionate; affectionate: used generally of desire.

Another nymph with fatal pow'r may rise,
To damp the sinking beams of Cælia's eyes;
With haughty pride may hear her charms confest,
And scorn the *ardent* vows that I have blest.

Prior.

ARDENTES, in authors of the middle age, an appellation given to those afflicted with the Erysipelas; so called, as seeming to be scorched by the disease. Hence also the abbey of St Genevieve at Paris was called *Domus Ardentium*, by reason, as it is said, that great numbers were cured of that distemper at the shrine of this saint, in the reign of Lewis VI.

ARDENT FEVER, a violent burning fever. See CAUSUS.

* ARDENTLY. *adv.* [from *ardent*.] Eagerly; affectionately.—With true zeal may our hearts be most *ardently* inflamed to our religion. *Spratt's Sermons*.

ARDENTNESS. See ARDENCY.

ARDENT SPIRITS: spirits distilled from fermented vegetables, so called because they will take fire and burn; such as brandy, rum, arrack spirit of wine, &c.

ARDEOLA, in ornithology, the name of a very beautiful bird, of the Brasils, of the heron kind, but no larger than a pigeon.

ARDER, or ARDRA. See ARDRA.

ARDS, fallowings, or ploughings of grounds.

ARDIER, a parish of Scotland, in the

county of Inverness, two miles and a half in length and as much in breadth: containing, in 1792, according to Mr Pryse Campbell's report to Sir J. Sinclair, 802 inhabitants, which is nearly double the number it was 50 years ago. The climate is rather sharp, but the soil is very fertile. The parish is bounded on the N. by the Moray Frith. There are 8 boats and 66 fishermen employed in the herring and white fisheries.

(1.) ARDES, a peninsula of Ireland, in the county of Down, nearly surrounded by the Irish channel, and the bays of Strangford and Carrickfergus. It was anciently a county by itself, appears from a patent roll of 1. Henry I. A. D. 1400, in Bermingham's tower Dublin castle, granted to Robert Fitz-jordan Savage, the office of sheriff of Ardes in Ulster.

(2.) ARDES, a town of France, in the department of Puy-de-Dome, a great mart for inland trade. Long. 3. 10. E. Lat. 45. 22. N.

ARDESIA. Irish slate.

ARDESLEY, the name of 3 villages in Yorkshire; viz. 1. EAST, and, 2. WEST, near Otley, and 3. near Settle.

ARDEVIL. See ARDEBIL.

ARDFERT, a town of Ireland, and the ancient capital of Kerry. It had an university, which was held in the highest esteem. It is a bishopric, see, and borough by ancient prescription, and has been held in *commendam* with the bishopric of Limerick ever since the Restoration. The bishops were anciently called Bishops of Kerry. St Brendan, to whom the cathedral is dedicated, had his first education in this country, under Bishop Eadmund, but he finished his studies in Connaught, St Iulath bishop of Tuam being his preceptor. The ruins here are very extensive. Near the cathedral was an anchorite tower, the loftiest and finest in the kingdom, being 120 feet high: it fell suddenly in 1771. In the ruined churches there are several inscriptions round the mouldings of the tomb-stones; and over an arch, behind Lady Glandore's house, is an inscription in relief done in a masterly manner, but the characters unknown.

ARDFINNAN, a village of Ireland, in the county of Cork.

ARDGLASS, an ancient but decayed sea port town of Ireland, in the county of Down, of which it was formerly the principal city. It has a large range of buildings in the stile of a castle, called by the inhabitants, the *New Works*, although they are so old, that there is no tradition when or for what purpose they were built. This range of fortification extends 250 feet in length, and 34 in breadth. The walls are 3 feet thick and have 3 towers in front, one at each end, and one in the centre, which makes them appear uniform and elegant. The buildings have been divided into apartments, 18 above and 18 below; with a staircase in the centre. Each apartment on the ground floor, has a small Gothic door, and a large square window; which would seem to indicate that they had been shops or warehouses, occupied at a very early period, by mercantile people from abroad. Within 10 feet of the S. tower, stands a square fort, called *Horn-castle*, from the great quantity of oxen and deers horns found about it. It measures 40 feet by 30, consists of two stories,

and from the fire places, appears to have been the kitchen and dining hall belonging to the inhabitants. There are also relics of several other castles, towers and gates, within the N. E. point of Ardglass harbour. There is also a curious natural cave on the shore. The duties of this port were farmed so lately as the reign of Charles I. It lies 7 miles N. E. of Downpatrick.

ARDGROOM, a harbour of Ireland, in the county of Kerry.

ARDINGLEIGH, a village in Sussex, near Lewes. It has a fair on the 30th of May.

ARDINGTON, a small town in Berkshire, N. of Wantage, near the vale of White horse.

ARDINGWORTH, a village in Northamptonshire, near Bothwell.

ARDKINGLASS, an ancient seat in Argyleshire, belonging to the Campbells of that title. The castle of Ardkinglass is very ancient. Mr McDougal, Minister of Lochgoil-head gives the following description of it in the Statistical Account of his parish. "The castle of Ardkinglass is composed of three separate towers, each of them fronting an area within. The space, between the towers, is defended by a strong wall, about 15 feet high. In the course of this wall is the great gate, which is defended by small round towers in flank, with apertures, through which those who assailed the gate might be annoyed with pikes, or with small fire arms. The gate is also defended by a small tower, immediately above it, called the *gate-tower*. Around the area, and within the walls, are smaller buildings, for lodging guests, for holding arms, and for store-houses and cellars. This castle is also built in a low situation, and could not stand out against a regular assault. The time in which this castle was built is not known; but there is certain evidence of its having been repaired in the year 1586. The residence of the family of Ardkinglass, of which the ruins can now scarcely be traced, was at a small distance from the present castle, but in a more commanding situation."

ARDLE, a river in Perthshire, which is formed by the junction of the rivulets, Arnot and Tarnachan, and gives name to the district, called *TRATHARDLE*.

ARDLEY, 1. a small town in Essex, near Reading; 2. a village in Oxfordshire, near Bicester.

ARDMEANAGH, a district of Ross-shire.

ARDMILLAN SPA, a chalybeate water of Ireland, in Castlereagh, in the county of Down.

ARDMORE, a parish of Ireland, in the county of Waterford.

ARDMORE-HEAD, a noted promontory of Waterford, on the S. coast of Ireland. It forms the E. side of Yough-hall harbour.

ARDNAMURCHAN, a district of Scotland in Argyleshire.

ARDNAREE, a village of Ireland, in the county of Mayo.

ARDOR VENTRICULI, a heat of the stomach, usually expressed by the term heart-burn, or *cardalgia*.

ARDOUR. *n. f.* [*ardor*, Lat. heat.] 1. Heat. — Joy, like a ray of the sun, reflects with a great ardour and quickness, when it rebounds upon

a man from the breast of his friend. *South.* 2. Heat of affection; as, love, desire, courage.—

The soldiers shout around with generous rage;
He prais'd their *ardour*, inly pleas'd to see
His host. *Dryden.*

Unmov'd the mind of Ithacus remain'd,
And the vain *ardours* of our love restrain'd.

Pope.

3. The person ardent or bright. This is only used by *Milton*.—

Nor delay'd the winged saint,
After his charge receiv'd; but from among
Thousand celestial *ardours*, where he stood
Veil'd with his gorgeous wings, up-springing
light,
Flew thro' the midst of heav'n. *Par. Lost.*

ARDRA, or } a small kingdom of Africa,
(1.) ARDRAH, } in Guinea properly so called. It lies at the bottom of the gulph of St Thomas. The inhabitants are very licentious, and have neither temple nor any place for religious worship. However, they are very courageous; and their king was absolute till lately that the king of Dahomay made war upon this and the neighbouring territories, brought them under subjection, and burnt the towns, particularly Ardres. The air is very unwholesome to Europeans; yet the natives live to a great age; but the small-pox makes great destruction among them. This country is fertile in Indian corn, palm-wine, plants, and fruits, which last all the year; and they make a great deal of salt.

(2.) ARDRAH, or ARDRES, the capital of the above kingdom, (N^o 1.) Long. 3. 5. E. Lat. 6. 0. N.

ARDRAHIN, a small town of Ireland in the county of Galway, and province of Connaught.

ARDRES, a small but strong town of France, in the department of the Straits of Calais. An interview was held near it between Francis I. and Henry VIII. king of England in 1520. The plain where the monarchs met, was long afterwards named the *Field of Gold Cloth*, on account of the finery and wealth displayed on that occasion. Ardres is seated in the midst of a morass. Long. 2. 0. E. Lat. 50. 50. N.

ARDROSS, the heights of Ross-shire.

(1.) ARDROSSAN, a parish of Scotland, in Ayrshire, 6 miles long from N. to S. and between 3 and 5 broad from E. to W. Though the soil is capable of great improvement, the agriculture of the parish is still in a low state. The number of its inhabitants, in 1793, was 1518. Mr Duncan, the minister, in his Statistical Account, gives the following description of the castle. "The castle of Ardrossan is of unknown antiquity, and seems, from what is still standing, to have been originally a huge building. Its walls were entire when Cromwell visited this part of the country, and fixed his head quarters at the county town. That usurper had rendered himself very unpopular by occupying the church of Ayr as an armoury; and, to conciliate the minds of the people to his measures, he beautified the town, by building the fort and parapet, which are yet standing. For this purpose, he threw down the walls of the Castle of Ardrossan, and carried the stones in boats over sea, so little were quarries known in those days, in

in which the county of Ayr almost every where abounds! The earl of Eglintoune at that time resided in the small island of Cumbray, and must have seen with much pain a place of such strength and beauty belonging to him laid in ruins. After the restoration, the fort of Ayr, and ground about it, were granted to this noble family in reward of their loyalty, and by way of compensation for the demolition of the Castle of Ardrossan."

(2.) ARDROSSAN, a small promontory in Ayrshire, which gives name to the parish, (No. 1.) and which terminates in a ridge of romantic rocks, running into the sea about a mile and a half from Saltcoats. It is situated 6 miles from Irvine, and 18 from Ayr.

ARDS, a barony in the county of Down in Ireland. It is a narrow slip of land, in some places three, and in none above six miles broad; but the soil is for the most part tolerably good. It lies between the lake of Strangford and the sea, and in the south part it is opposite to Lecale. Sir Thomas Smith obtained a patent for his barony from Queen Elizabeth, and sent his natural son with a colony to possess it; but he was intercepted and slain by an Irishman. After Sir Thomas's death, Ards was granted by James I. to some of the Scots nobility.

ARDSALLAGH, a small town of Ireland in the county of Roscommon.

ARDSALLAS, a village, in the county of Clare.

ARDSTINCHAR, a river of Scotland, in Airshire, which runs for about 25 miles through the country, and empties itself into the sea at the village of Ballantrae; but it is rapid and shallow, and can only admit of small boats. At the mouth of this river there is a considerable salmon fishery, which yields a rent of above L.80 a year. The salmon are thought as good as any in Scotland, and sell upon the spot at 1½d. the lb. and it is but very lately they were more than 1d.

ARDTULLY, a village of Ireland, in the parish of Kilgarwan, near Callan, in the county of Kerry.

ARDUBA, an ancient city of the Pannonians. It was taken by Germanicus about the 7th year of the Christian æra; but its reduction was more owing to the disagreement that reigned among the inhabitants than to the valour of the Romans. The greater part of the citizens were for submitting; but the women, more fond of their ancient laws and liberties than the men, joined some Roman deserters, and falling upon their husbands, killed a great number of them; but being at last overcome by the men, who then submitted to the Romans, the women either threw themselves headlong from the tops of the walls, or, setting fire to their houses, burnt themselves and their children to death.

ARDUINA, BASTARD LYCIUM, in botany, a genus of the pentandria monogynia class; the corolla of which has a single petal; the stigma is bifid; and the fruit is a double-celled berry with a single seed. There is only one species.

* ARDUITY. *n. s.* [from *arduous*.] Height; difficulty. *Dist.*

* ARDUOUS. *adj.* [*arduous*, Lat.] 1. Lofty; to climb.—

High on Parnassus' top her sons she show'd,
And pointed out those *arduous* paths they trod.

Pope.

2. Difficult.—It was a means to bring him up in the school of arts and policy, and so to fit him for that great and *arduous* employment that God designed him to. *South.*

* ARDUOUSNESS. *n. s.* [from *arduous*.] Height; difficulty.

ARDWELL, a district of Scotland, in the parish of Stony Kirk, in Wigtonshire, containing, in 1791, by Mr Blain's report to Sir John Sinclair, 460 inhabitants. See STONYKIRK.

ARDWICK, a village in Lancashire, near Manchester.

(1.) ARE, a river in France.

(2.) ARE, a river in the W. Riding of York.

(3.) ARE, or AER, a river in Westphalia.

(4.) ARE, or AIR. See AIR.

(5.) * ARE. The third person plural of the present tense of the verb *to be*; as young men *are* rash, old *are* cautious.

(6.) * ARE, or ALAMIRE. The lowest note but one in Guido's scale of musick.—

Camut I am, the ground of all accord,

Are to plead Hortensio's passion;

B mi Bianca take him for thy lord,

C faut, that loves with all affection. *Shaksp.*

(1.) * AREA. *n. s.* [Lat.] 1. The surface contained between any lines or boundaries.—The area of a triangle is found by knowing the height and the base. *Watt's Logick.* 2. Any open surface, as the floor of a room; the open part of a church; the vacant part or stage of an amphitheatre. As an inclosed place, as lists, or a bowling green, or grass plots.—Let us conceive a floor or *area* of good length, with the breadth somewhat more than half the longitude. *Wotton.* The Alban lake is of an oval figure, and, by reason of the high mountains that encompass it, looks like the *area* of an vast amphitheatre. *Addison.*

In *areas* vary'd with Mosaick art,

Some whirl the disk, and some the javelin dart.

Pope.

(2.) AREA, [from *arere*, to be dry,] in architecture, denotes the space or site of ground on which an edifice stands. It is also used for inner courts, and similar portions of ground.

(3.) AREA, in geometry, the superficial contents of any figure. Thus, if a figure, *e. g.* a field, be in form of a square, and its side be 40 feet long, its area is said to be 1600 square feet; or it contains 1600 little squares, each a foot every way.

(4.) AREA, in medicine, a disease which makes the hair fall off. The area is a general kind of depilation; and is distinguished into two species, Alopecia, and Ophiasis.

(5.) AREA, in OPTICS. See FIELD.

* To AREAD, or AREED. *v. a.* [*ardan*, Sax. to counsel.] To advise; to direct.

Knights and ladies gentle deeds,

Whose praises having slept in silence long,

Me, all too meane, the sacred muse *areeds*

To blazon broad.

Fairy Queen.

But mark what I *aread* thee now: *avant,*

Fly thither whence thou fled'st! If from this hour

Within

Within these hallow'd limits thou appear,
Back to th' infernal pit I drag thee chain'd.

Paradise Lost.

AREB, a kind of imaginary money used in the dominions of the great mogul. Four arebs are equal to one crou, or 100 lacs; one lac to 100,000 roupies.

AREBADILLO, or } a river of Spain, in Old
AREBATILLO, } Castile, that falls into the Douro.

AREBO, or } a town on the slave-coast of
AREBON, } Guinea, in Africa, seated at the mouth of the river Formoso. The English had once a factory there, as the Dutch have still. It is a large oblong place, indifferently well peopled, and furnished with houses built of reeds and leaves. Long. $^{\circ}$ 8. E. Lat. $^{\circ}$ 6. N.

ARECA, the FAUSEL-NUT, in botany, a genus of the order of palmæ pennatifoliæ. The male has no calyx, but three petals, and nine stamina; the female has no calyx; the corolla has three petals, and the calyx is imbricated. There are two species, viz.

1. ARECA CATHECU, a native of India. It has no branches, but its leaves are very beautiful; they form a round tuft at the top of the trunk, which is as straight as an arrow. It grows to the height of 20 or 35 feet, and is a great ornament in gardens. The shell which contains the fruit is smooth without, but rough and hairy within; in which it pretty much resembles the shell of the coconut. Its size is equal to that of a pretty big walnut. Its kernel is as big as a nutmeg, to which it bears a resemblance without, and has also the same whitish veins within when cut in two. The centre of the fruit, when it is soft, is contained in a greyish and almost liquid substance, which grows hard in proportion as it ripens. The extract of this nut has been supposed to be the terra ponca of the shops, at least that it is a very similar substance both in colour and taste: But according to later observations, the genuine drug was to be obtained from the MIMOSA *Catechu*. The fruit when ripe is astringent, but not unpalatable, and the shell is yellowish. Of this fruit there is a prodigious consumption in the East Indies, there being scarce any person, from the richest to the poorest, who does not make use of it; and the trade they drive in it is incredible. The chief use that is made of areca is to chew it with the leaves of betel, mixing with it lime made of shells. Cornelius le Brun asserts, that they mix the leaves of betel with a red drug of Siam, and with white chalk. In order to chew it, they cut the areca into four quarters, and take one quarter of it, which they wrap up in a leaf of betel, over which they lay a little of the lime; afterwards they tie it, by twisting it round. This preparation for mastication is called *pinang*; which is a Malayan word used all over the East Indies. The pinang provokes spitting very much, whether it be made with dried or fresh areca; the juice is red, which colour the areca gives it.—The mastication cools the mouth, and relieves the teeth and gums. When they have done chewing the pinang, they spit out the gross substance that remains in the mouth. They are under a mistake who imagine that fresh areca melts entirely in the

mouth. Nor is it a less mistake to think that the teeth which are tinged red during the time of chewing, always retain that colour. As soon as they have done chewing the pinang, they wash their mouth with fresh water, and then their teeth are white again. The Europeans who live at Batavia, or Malacca, and in the Sunda and Molucca islands, use pinang as much as the Indians do; and by washing their teeth they preserve them white. Some pretend that areca strengthens the stomach, when the juice of it is swallowed, as most of the Indians do. Another property ascribed to it is, its curing or carrying off all that might be unwholesome or corrupt in the gums. When eaten by itself, as is sometimes done by the Indians, it impoverishes the blood, and causes the jaundice; but it is not attended with these inconveniences, when mixed in the usual way with betel. The Siamese call it *phau*, in their language. The best areca of the Indies comes from the island of Ceylon. The Dutch East India Company send a great deal of it in their ships into the kingdom of Bengal. There grows in Malabar, a sort of red areca, which is very proper for dyeing in that colour. The same company send some of it from time to time to Surat and Amadabat, for the use of the dyers in the dominions of the Grand Mogul.

2. ARECA OLERACEA, or true cabbage palm, is the most beautiful, and perhaps the tallest, of all trees. The trunk is perfectly straight, and marked with rings at the vestigium of the footstalks of the leaves. Near the ground it is about 7 feet in circumference; but tapers as it ascends, and attains the height of 170 or 200 feet. The bark is of an ash colour, till within 25 or 30 feet of the extremity of the tree; when it alters at once to a deep sea green, which continues to the top. About 5 feet from the beginning of the green part upwards, the trunk is surrounded with its numerous branches, in a circular manner; all the lowermost spreading horizontally with great regularity; and the extremities of many of the higher branches bend wavingly downwards, like so many plumes of feathers. These branches, when full grown, are 20 feet long, more or less; and are thickly set on the trunk alternately, rising gradually superior one to another: Their broad curved sockets so surround the trunk, that the sight of it, whilst among these, is lost, which again appears among the uppermost branches, and is there enveloped in an upright green conic spire, which beautifully terminates its great height. The above-mentioned branches are somewhat round underneath, and slightly grooved on the upper side: They are likewise decorated with a very great number of green pennated leaves: Some of these are near three feet long, and an inch and an half broad, growing narrower towards their points, as well as gradually decreasing in length towards the extremities of the branches. As there are many thousand leaves upon one tree: every branch bearing many scores upon it, and every leaf being set at a small and equal distance from one another, the beauty of such a regular lofty group of waving foliage, susceptible of motion, by the most gentle gale of wind, is not to be described. The middle rib, in each leaf, is strong and prominent,

supporting it on the under side, the upper appearing smooth and shining. The pithy part of the leaf being scraped off, the inside texture appears to be so many longitudinal thread like filaments. These, being spun in the same manner as they do hemp, or flax, are used in making cordage of every kind, as well as fishing nets, which are esteemed stronger than those usually made from any other material of the like nature. Upon removing the large leaves, or branches, which surround the top of the trunk, a little way above the beginning of the green bark just mentioned, what is called the *cabbage* is discovered lying in many thin, snow white, brittle flakes, in taste resembling an almond, but sweeter. This substance, which cannot be procured without destroying the tree, is boiled, and eaten with mutton by the inhabitants of the West Indies, in the same manner as turnips and cabbage are with us; though it must appear the height of extravagancy and luxury to fell so stately a tree, which would be an ornament to the most magnificent palace in Europe, to gratify the taste of any epicure, especially as there is but a very small part of it eatable. What is called the *cabbage flower*, grows from that part of the tree where the ash coloured trunk joins the green part already described. Its first appearance is a green husky spatha, growing to above 20 inches long, and about four broad; the inside being full of small white stringy filaments, full of alternate protuberant knobs, the smallest of these resembling a fringe of coarse white thread knotted: these are very numerous, and take their rise from larger footstalks; and these footstalks likewise are all united to different parts of the large parent stalk of all. As this husky spatha is opened while thus young, the farinaceous yellow seed in embryo, resembling fine saw dust, is very plentifully dispersed among these stringy filaments, which answer the use of apices in other more regular flowers: these filaments being cleared of this dust, are pickled, and esteemed among the best pickles either in the West Indies or in Europe. But if this spatha is not cut down and opened whilst thus young; if it be suffered to continue on the tree, till it grows ripe and bursts; then the inclosed part, which whilst young and tender, is fit for pickling, will by that time have acquired an additional hardness, become soon after ligneous, grow bushy, consisting of very many small leaves, and in time produce a great number of small oval thin shelled nuts, about the bigness of unhusked coffee berries: These, being planted, produce young cabbage trees. The sockets or grooves, formed by the broad part of the footstalks of the branches, are used by the negroes as cradles for their children. On the inner side of the very young footstalks are tender pellicles, which when dried, it is said, make a writing paper. The trunks serve as gutterings; the pith makes a sort of sago; and the nuts yield oil by decoction. In the pith also, after the trees are felled, there breeds a kind of worms, or grubs, which are eaten and esteemed a great delicacy by the French of Martinico, St Domingo, and the adjacent islands. These

says Father Labat, are about two inches of the thickness of one's finger; the

head is black, and attached to the body, without any distinction of neck. Their preparation for the table is as follows: They are strung on wooden skewers before a fire; and as soon as heated, are rubbed over with raspings of crust, salt, pepper, and nutmeg: this powder absorbs all the fat, which during the cookery would otherwise escape; when properly roasted, they are served up with orange and citron sauce. These worms being exposed for some time to the sun, are said to yield an oil, which is of great efficacy in the piles.—The oil in question, says Labat, is never to be heated before its application to the part affected; as repeated experiments have evinced that its spirit is totally dissipated by the fire.

ARECLUD, or **ALCLURD**, the ancient name of Dumbarton, when it was in possession of the Macs, of whose kingdom it was the capital.

AREDEM, a town on the Malabar coast.

To AREED, *v. a.* To judge. *Spens.* See **To AREAD**.

***AREFACTION**. *n. f.* [*arefacio*, Lat. to dry.] The state of growing dry; the act of drying.—From them, and their motions, principally proceed *arefaction*, and most of the effects of nature. *Bacon*.

***To AREFY**. *v. a.* [*arefacio*, Lat. to dry.] To dry; to exhaust of moisture.—Heat drieth bodies that do easily expire, as parchment, leaves, roots, clay, &c. and so doth time or age *arefy*, as in the same bodies, &c. *Bacon's Natural History*.

AREGA, a town in Portuguese Estremadura.

AREGNO, a district of Corsica.

AREGON, an old officinal ointment.

AREKEA, a port town of the Red Sea, 55 miles from Suaquem. It is large and well fortified, and has an island in the entrance of the port, about 200 paces in diameter.

ARELAS, } or **ARELATUM**, a town of Gallia

ARELATE, } *Narbonensis*, situated on the Rhone, denoting a town on, or beyond, a marsh, according to the particular situation of the speaker; called *Arelate Sextanorum*, because it had a colony of the sixth legion. Ausonius says there was a double Arelas, one on each side of the river, and joined by a bridge. That on the left side is thought to have been built by Constantine. Terentius's father was sent by Julius Cæsar, at the head of the colony, and hence the appellation *Juliana Paterna*, as appears from an inscription. It was the favourite place of the Romans, and greatly ornamented; and hence called **GALLULA ROMANA**. It is now called **ARLES**. Long. 4. 43. E. Lat. 43. 41 N.

ARELATIL, a town in Lancashire, near the Duddon, opposite to Millum Castle.

ARELEY, or **ARNLEY**, 3 English villages; viz. 1. in Cheshire, near Norwich; 2. in Staffordshire, near Seisdon; 3. in Shropshire, extending a mile on the Severn.

ARELEY KING'S; } Two villages in Worcester
ARELEY NETHER; } shire, 6 and 7 miles S. of Bewdley.

AREM, or **AL-AREM**, [Arab. a dam of water.] a vast mound or dam, which formed a stupendous reservoir above the city Saba, whose rupture caused an inundation, famous in eastern writers.

(1.) **AREMBERG**, a county of Germany in the

circle of Westphalia, which was erected into a principality by Maximilian II. in favour of John de Jigne, Lord of Brabazon.

(1.) **AREMBERG**, or } the capital of the coun-
AREMBURG, } ty, (See No. 1.) seated
on the Are, about 24 miles S. of Cologne and de-
fended by a castle. Long. 7. 3. E. Lat. 50. 57. N.

AREMORICA, or **ARMORICA**, [from *are moer*,
Celt. i. e. beyond the sea,] a part of Gaul, placed
by Cæsar and Hirijs, between the Sequana and
Ligeris. Pliny says, that Aquitania was formerly
called *Aremorica*; but in this he is singular. In
the lower age, Armorica was confined to Bretagne
in France.

AREN, a small town of Dorsetshire, on the
coast; four miles E. of Wareham, and one from
Pool Bay.

(1.) **ARENA**, in anatomy, [*arena*, Lat. Sand,]
gravel bred in the human body.

(2.) **ARENA**, in antiquity, a place where the
gladiators fought; so called from its being always
strewed with sand, to conceal from the view of
the people the blood spilt in the combat. Nero
is said to have strewed the arena with gold dust.
See **AMPHITHEATRE**.

(3.) **ARENA**, in architecture, the middle of a
temple, comprehending the whole space between
the antæ and the extreme wall of the building.

(4.) **ARENA**, in geography, a town of Calabria
in Naples.

* **ARENACEOUS**. *adj.* [*arena*, Lat. sand,]
Sandy; having the qualities of sand.—A piece of
the stone of the same mines, of a yellowish brown
colour, an *arenaceous* friable substance, and with
some white spar mixed with it. *Woodward on
Fossils*.

ARENACUM, } one of the 4 towns or larger
ARENACUS, } villages in the island of the
Batavi, mentioned by Tacitus: Now called **ARN-
HEIM**, in Guelderland. Long. 5. 20. E. Lat. 52.
1. N.

(1.) **ARENARIA**, in botany, **SANDWORT**: A
genus of the decandria trigynia class; and in the
natural method ranking under the 22d order, *Ca-
mpanulæ*. The calyx has five open leaves; the
petals are five, and entire; the capsule is unilocu-
lar, and contains many seeds. There are 17 spe-
cies, only 7 of which are natives of Britain, viz.

1. **ARENARIA LARICIFOLIA**, Larch-leaved
sandwort.

2. **ARENARIA PEPLOIDES**, sea sandwort;

3. **ARENARIA RUBRA**, purple-flowered sand-
wort;

4. **ARENARIA SAXATILIS**, mountain sandwort.

5. **ARENARIA SERPYLLI-FOLIA**, least sandwort.

6. **ARENARIA TENUI-FOLIA**, fine-leaved sand-
wort.

7. **ARENARIA TRINERVIS**, plantain-leaved sand-
wort.

(II.) **ARENARIA**, in ornithology, a bird called
in English the *sanderling*, and in some places, par-
ticularly in Cornwall, the *curwillet*. It is a water
bird, of the long-legged, and open-footed kind,
and is a little larger than the *tringa minor*, or sand
piper.—These birds are common about the sea-
shore, and generally fly in large flocks.

(III.) **ARENARIA**, in Vitruvius's writings, sand-
pits, or ground out of which sand is dug.

ARENARII, in antiquity, gladiators who com-
batted with beasts in the arena, or amphitheatre.
The arenarii were slaves of the lowest rank; and
though manumitted, were not capable of being
Roman citizens. They were the same with the
BESTIARII.

ARENARIUM, in ecclesiastical writers, a ce-
metry or burying-ground. The arenaria were
properly a kind of pits or caverns, wherein the
ancient Christians not only buried their dead, but
held their religious assemblies in times of perse-
cution.

* **ARENATION**. *n. s.* [from *arena*, Lat. sand,]
Is used by some physicians for a sort of dry bath,
when the patient sits with his feet upon hot sand.
Diæ.

ARENDONK, a town near Antwerp.

* **ARENOSE**. *adj.* [from *arena*, Lat. Sandy,]
full of sand. *Diæ*.

ARENS, or **ARENSHARDE**, a district of Den-
mark, in the duchy of Sleswick, through which
runs the famous wall called **DANNEVASK**, which
Gottric, king of Denmark, built in the 9th cen-
tury, across the country from Hollingsted to the
Sley, (an extent of 46 miles) as a defence against
the inroads of the Saxons and Selavi. The natives
of Arens were the first in the country who profes-
sed Christianity; and their church, built in 826,
was often demolished by the idolators.

(1.) **ARENSBERG**, a county of Germany, in
Westphalia.

(2.) **ARENSBERG**, a small town of Germany,
seated on a hill in the circle of Westphalia, upon
the river Roer. Long. 8. 20. E. Lat. 58. 15. N.

ARENSBOURG, } an episcopal and maritime
ARENSBURG, } town of Livonia in Sweden,
seated in the isle of Osel, in the Baltic Sea. Long.
22. 40. E. Lat. 58. 15. N.

ARENSHARDE. See **ARENS**.

ARENSWALDE, a town of Germany, in the
New Marche of Brandenburg, seated on the lake
Slauin, on the frontiers of Pomerania. Long. 15.
32. E. Lat. 53. 13. N.

ARENTIM, a town of Portugal, in Entre-
Duero-E-Minho.

* **ARENULOUS**. *adj.* [from *arenula*, Lat. sand,]
Full of small sand; gravelly.

AREOLA, the coloured circle around the nip-
ple of the breast. See **ANATOMY**, **INDEX**.

AREOMETER. See **ARÆOMETER**.

AREOPAGITES, Athenian judges, members
of the court of Areopagus. See **AREOPAGUS**, §
1, 4—7.

AREOPAGITIC, belonging to the court of
Areopagus.

(1.) **AREOPAGUS**, a sovereign tribunal at A-
thens, famous for the justice and impartiality of
its decrees, to which the gods themselves are said
to have submitted their differences. The court
was situated in the town, on a rock or hill oppo-
site to the citadel. The word signifies strictly,
the *rock of Mars*.

(2.) **AREOPAGUS**, **EDIFICE**, &c. OF THE. The
edifice of the Areopagus was extremely simple;
and its roof, which was at first of the most com-
mon materials, remained in that state till the time
of Augustus. This we learn from Vitruvius. O-
restes was the first who thought of embellishing it.

(3) AREOPAGUS, ESTABLISHMENT OF THE COURT OF PLATO IN PARADES THE ESTABLISHMENT OF THE AREOPAGUS IN ADOPTION. Other authors think, with good reason, that the tribunal was a body created before SOCRATES. But the best authorities agree him the honour of his reformation. The city of Athens governed till his time by the council of a democracy, which, according to the ancient constitution, was a most trifling affair, and even in a state of fixed political or civil liberty, however widely un-

[illegible]

are its bane and its dishonour. Isocrates draws a most beautiful and striking picture of those venerable and astonishing men, and the order and harmony which flourish in Athens by their wise administration. The judges of the Areopagus, says that author, were more industrious to prevent crimes, by representing them in an odious light, than to establish modes of punishment. It was their opinion, that the enemies of the state were the instruments destined by the gods to punish the wicked; but that it was their province to correct and reform public and private manners. They were vigilantly attentive to the conduct of all the citizens, but particularly to that of the youth. They well knew that the impetuosity of juvenile passion gave the most violent shocks to health and growing virtue; that it was the duty of inspectors of education to soften the austerity of moral discipline with innocent pleasure; and that no recreations were more eligible than bodily exercises which enable a young man to give a good education its full play, which improve health, give a pleasurable and agreeable vivacity, and even fortify the mind. The fortunes of the Athenians were too unequal to admit the same mode of education; and therefore the youth were trained in a manner suitable to the rank and circumstances of their respective families. Those of the inferior classes were taught agriculture and commerce; from this principle, that idleness is followed by indigence, and that indigence excites to daring and atrocious crimes. Having thus endeavoured, by wise precautions, to preclude the entrance of moral evil, they thought they had little to fear. Exercises of the body, such as horsemanship and hunting, were objects of education to the youth of liberal fortune. In this sage distribution, their great aim was to prevent the poor from committing crimes, and to facilitate to the rich the acquisition of virtue. Not satisfied with having established good laws, they were extremely careful to see that they were observed. With this view, they had divided the city into quarters, and the country into cantons. Thus every thing passed under their eyes; nothing escaped them; they were acquainted with the private conduct of every citizen. Those who had been guilty of any irregularity were cited before the magistrates, and were reprehended, or punished in proportion to their misdemeanour. The same Areopagites obliged the rich to relieve the poor. They repressed the intemperance of the youth by a severe discipline. Corruption in magistrates was suppressed by the punishments denounced against it; and the old men, at the sight of the employments of the young, felt themselves animated with a degree of juvenile vigour and activity. Religion came likewise under the cognizance of the Areopagites. Plato durst never, as we are told by Justin Martyr, divulge his private opinion concerning the Deity. He had learned from the Egyptians the doctrine of Moses. It appeared to him the best, and he embraced it with ardour. But his dread of the Areopagites, who were attached to the prevailing system, would not permit him even to name the author of sentiments which opposed the common tradition. The public edifices, the cleanness of

the streets, the pay of the soldiers, the distribution of the public money; in a word, whatever interested the republic, was under the direction of the Areopagus. The people themselves, jealous as they were of their power, did nothing without consulting this assembly, and suffered it, without a murmur, to amend their precipitate decrees. Yet this authority, however great it may seem, was subject to the laws; by them rewards and punishments were determined; and those respectable judges gave an account of the exercise of their trust to public censors, who were placed betwixt them and the people, to prevent the aristocracy from growing too powerful.

(7.) AREOPAGUS, QUALIFICATIONS OF THE MEMBERS OF THE. The most important qualifications were required in those who entered into the Areopagus. Solon made a law, by which they who had not been archons for a year should not be admitted members of the Areopagus. To give more force to his law, he subjected himself to it, and was only admitted on that title. This was but the first step; those annual magistrates, after having given law to the republic, were interrogated on their administration. If their conduct was found irreproachable, they were admitted Areopagites with eulogium; but the smallest misconduct excluded them from that honour for ever. What administration was to be expected from a tribunal so well composed, what veneration was not due to men of such talents and virtue? Such respect was paid them that people presumed not to laugh in their presence; and so well established was their reputation for equity, that those whom they condemned, or dismissed without granting their petition, never complained that they had been unjustly treated.

(8.) AREOPAGUS, SENTENCES, CORRUPTION AND DECLINE OF THE. Of all the judgments of the Areopagus, the most famous one, except that of Mars, was the sentence which they passed on Orestes. His trial, which happened under Demophoon the 12th king of Athens, in 375 of the Attic æra, owed all its fame to a remarkable circumstance, that gave rise to a custom which was observed ever afterwards. Orestes had killed his mother. He was accused before the Areopagus, and cited to appear in that court. He would have lost his life in consequence of the equal division of the votes, had not Minerva, moved with his misfortunes, declared herself for those who had absolved him, and joined her suffrage to them. Thus Orestes was saved. In veneration to this miracle, the Areopagites, whenever the suffrages were equally divided, decided in favour of the accused, by granting him what they termed *the gift of Minerva*. Cephalus and Dædalus were condemned by the Areopagus long before the time of Orestes. We find in ancient authors some decisions of this tribunal, which bear the strongest marks of justice, though their objects are not interesting. We shall here quote an anecdote from Aulus Gellius, and Valerius Maximus, of a woman who was accused of having poisoned her husband and her son. She was taken and brought before Dolabella, who was then proconsul of Asia.

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During the performance, he remarked the iteration of the words, and the frequent returns of UT, RE, MI, FA, SOL, LA: he observed likewise a dissimilarity between the closeness of the syllable MI and the broad open sound of FA, which he thought could not fail to impress upon the mind a lasting idea of their congruity; and immediately conceived a thought of applying these six syllables to perfect an improvement either then actually made by him, or under consideration, viz. that of converting the ancient tetrachords into hexachords. Struck with the discovery, he retired to his study; and having perfected his system, he communicated it to the brethren of his own monastery, from whom it met with but a cold reception, which in the epistle to his friend, he ascribes undoubtedly to its true cause, envy. His interest, however, with the abbot, and his employment in the chapel, gave him an opportunity of trying the efficacy of his method on the boys who were training up for the choral service, and it exceeded his most sanguine expectation. "To the admiration of all, says cardinal Baronius, a boy thereby learnt, in a few months, what no man, though of great ingenuity, could before that attain in several years." The fame of Guido's invention soon spread abroad, and his method of instruction was adopted by the clergy of other countries. Kircher says, that Hermannus bishop of Hamburg, and Elviricus bishop of Osnaburg, made use of it; and by the authors of the *Histoire Littéraire de la France*, that it was received in that country, and taught in all the monasteries in the kingdom. It is certain that the reputation of his great skill in music had excited in the pope a desire to see him; of which, and of his going to Rome for that purpose, and the reception he met with from the pontiff, he himself has given a circumstantial account. It seems that John XX. or, some writers stile him, the XIX. pope of that name, having heard of the fame of Guido, and desiring to see him, sent three messengers to invite him to Rome; upon their arrival, it was resolved by the brethren of the monastery, that he should be attended by Grimaldo the abbot, and Peter the chief of the canons of the church of Arezzo. Arriving at Rome, he was received with great kindness. The pope had several conversations with him, in which he interrogated him as to his knowledge in music; and upon sight of an antiphonary which Guido had brought with him, marked with the syllables agreeable to his new invention, the pope looked on it as a kind of prodigy; and ruminating on the doctrines delivered by Guido, would not stir from his seat till he had learned perfectly to sing off a verse: upon which he declared, that he could not have believed the efficacy of the method, if he had not been convinced by the experiment he had himself made of it. The pope would have detained him at Rome; but labouring under a bodily disorder, and fearing an injury to his health from the air of the place, and the heats of the summer, then approaching, Guido left that city upon a promise to revisit it, and explain to his holiness the principles of his new system. On his return homewards, he made a visit to the abbot of Pomposa, a town in the duchy of Ferrara, who was anxious that he should

settle in the monastery of that place: which invitation he accepted; and it was here that he composed a tract on music, intitled *Micrologus*, i. e. a short discourse; which he dedicated to Theodald bishop of Arezzo. Vossius speaks of another musical treatise written by him, and dedicated to the same person. Most authors who mention Guido, speak of the *Micrologus* as containing the sum of his doctrine: but it is in a small tract, intitled *Argumentum novi Cantus inveniendi*, that his declaration of his use of the syllables, with their several mutations, and in short his whole doctrine of solmisation, is to be found. This tract makes part of an epistle to an intimate friend of Guido, whom he addresses, *Beatissimo atque dulcissimo fratri Michaeli*, at whose request it seems to have been composed. Whether Guido was the author of any other tracts, is not easy to determine. It nowhere appears that any of his works were ever printed, except that Baronius, in his *Annales Ecclesiastici*, tom. xi. p. 73, has given at length the epistle from him to his friend Michael of Pomposa, and that to Theodald bishop of Arezzo, prefixed to the *Micrologus*; and yet the writers on music speak of the *Micrologus* as a book in the hands of every one. Martini cites several manuscripts of Guido; viz. two in the Ambrosian library at Milan, the one written about the 12th century, the other less ancient; another among the archives of the chapter of Pistoja, a city in Tuscany; and a third in the Mediceo-Laurenziano library at Florence, of the 15th century: these are clearly copies of the *Micrologus*. Of the epistle to Michael, with the *Argumentum novi Cantus*, he mentions only one, which he says is somewhere at Ratisbon. Of the several tracts abovementioned, the last excepted, a manuscript is extant in the library of Baliol college in Oxford. Several fragments of the two first, in one volume, are also among the Harleian manuscripts now in the British Museum N^o 3199; but so much mutilated, that they afford but small satisfaction to a curious inquirer.

(3.) ARETIN, Leonard, one of the most learned men of the 15th century, was secretary to the republic of Florence, and translated from the Greek into Latin some of Plutarch's Lives, and Aristotle's Ethics: he also composed 3 books of the Punic war, as a supplement to those wanting in Livy; the history of the transactions in Italy during his time; that of ancient Greece; that of the Goths; that of the republic of Florence; and many other books. He died in 1443, aged 74.

(4.) ARETIN, Peter, a native of Arezzo, who lived in the 16th century. He was famous for his satirical writings; and was so bold as to carry his invectives even against sovereigns, and thus got the title of the *Scourge of Princes*. Francis I. the Emperor Charles V. most of the princes of Italy, several cardinals, and many noblemen, courted his friendship by presents, either because they liked his compositions, or perhaps from an apprehension of falling under the lash of his satire. Aretin became thereupon so insolent, that he is said to have got a medal struck, on one side of which he is represented with these words, IL DIVINO ARETINO; and on the reverse, sitting upon a throne, receiving the presents of princes, with these words, I PRINCIPI TRIBUTATI DA POPOLI,

ARISTURANO IL SERVIDOR LORO. Some imagine that he gave himself the title of *Divine*, signifying thereby that he performed the functions of a god upon earth, by the thunderbolts with which he struck the heads of the highest personages. He used to boast, that his lampoons did more service to the world than sermons; and it was said of him, that he had subjected more princes by his pen than the greatest heroes had ever done by their arms. Aretin, however, wrote many irreligious and obscene pieces; such are his dialogues, called *Ragionamenti*. There is likewise imputed to him another very obscene performance, *De omnibus Veneris schematibus*. "It was about the year 1525 (says Mr Chevallier,) that Julio Romano, the most famous painter of Italy, instigated by the enemy of the salvation of mankind, invented drawings to engrave 20 plates: the subjects are so immodest that I dare not name them. Peter Aretin composed sonnets for each figure. George Vasari, who relates this in his Lives of the Painters, says, he does not know which would be the greatest impurity, to cast one's eyes upon the drawings of Julio, or to dip into the verses of Aretin." Some say that Aretin changed his libertine principles; but however this may be, it is certain that he composed several devotional pieces. He wrote a Paraphrase on the penitential Psalms; another on Genesis; with the lives of the Virgin Mary, St Catherine of Sienna, and St Thomas Aquinas. He was also author of some comedies. He died in 1556, about 65 years old.

ARETIUM, in ancient geography, one of the 12 cities of old Etruria. See **AREZZO**.

ARETOLOGI, in antiquity, a sort of philosophers, chiefly of the Cynic or Stoic tribe, who, having no school or disciples of their own, haunted the tables of great men, and entertained them in their banquets with disputations on virtue, vice, and other popular topics. These are sometimes also denominated *Circulatores Philosophi*. In this sense, the word is derived from the Greek *aretos*, virtue, and *logos*, discourse. Some authors derive it from *agros*, gratis, "agreeable;" and denote Aretologi, persons who strive to entertain their audience with jokes and pleasant tales; which indeed seems the more natural explication.

* **ARETOLOGY**, *n. s.* [from *aretos*, virtue, and *logos*, to discourse.] That part of moral philosophy which treats of virtue, its nature, and the means of arriving at it. *Dist.*

AREY-BECK, a village in Westmoreland, near Gowburrow park on the borders of Cumberland.

AREZZO, anciently **ARETIUM**, a city of Italy, in Tuscany, seated in the territory of Florence, on the declivity of a mountain in the middle of a fruitful plain, 17 m. from Gitta di Castella, and lying between it and Florence. It is an ancient city, and a bishop's see; and was famous for a kind of earthen ware much esteemed by the Romans. It was greatly fallen to decay when Cosmo de Medicis took it under his protection; since which it has been recovering gradually. It was the birth place of Mecenas. Long. 12. 2. E. Lat. 43. 27. N.

ARE, afraid. *Chaucer*.

ARGA, a river of Spain, which waters Navarre, and falls into the Ebro.

* **ARGAL**, *n. s.* Hard lees sticking to the sides of wine vessels, more commonly called tartar. *Dist.*

ARGAN, a town of New Castile.

ARGANIL, a town of Portugal, in Beira.

ARGATHELIA, the ancient name of **ARGYLL**.

ARGEA, or } in Roman antiquity, 30 human

ARGEI, } figures, made of rushes, thrown

annually by the priests or vestals into the Tiber, on the day of the ides of May. Plutarch, in his Roman Questions, inquires why they were called *Argea*. Two reasons are assigned; viz. 1. That the barbarous nation who first inhabited these parts, cast all the Greeks they could meet with into the Tiber: for Argians was a common name for all Grecians; but, that Hercules persuaded them to quit so inhuman a practice, and to purge themselves of the crime, by instituting this solemnity. 2. That Evander, an Arcadian, and a sworn enemy of the Argians, to perpetuate that enmity to his posterity, ordered the figures of Argians to be thus cast into the river.

ARGEIA, or **ARGOLIS**, a district of Peloponnesus, situated between Arcadia on the W. the Egean Sea on the E. Laconia, and the Sinus Argolicus on the S. and the territory of Corinth and the Sinus Saronicus on the N.; so called from Argos, the capital; now *Romania di Morea*.

ARGEII, or **ARGIVI**, (as the Romans called them,) the **ARGIVES**, inhabitants of **ARGEIA**.—They were a colony who migrated, it is said, from Egypt, under the command of Inachus.—Polemon and Ptolemy Mendesiis, ancient Greek writers, inform us, that Inachus was contemporary with Amosis, who demolished Avaris, and expelled the shepherds out of Egypt. If, with some learned chronologers, we suppose Inachus to have begun to reform the Argives, A. A. C. 1866, and to have died A. A. C. 1868, he must have been co-eval with Amosis, who reigned in Upper Egypt, 15 years before the expulsion of the shepherds, and 10 years after that event, which happened A. A. C. 1806. Inachus was styled the *Son of the Ocean*, because of his unknown origin, or because he had come by sea into Greece. Before his arrival, the inhabitants were rude and barbarous. These he united and civilized, and instructed in various arts. His son Phoroneus instituted the laws of government; and, on that account, has been called the *first king of Argos*, the *first of men*, and the *father of mortals*. The family of Inachus, after having kept possession of the throne 347 years, were expelled by Danaus, who arrived, A. A. C. 1509, with a colony from Canaan. Acrisius, the last king of Argos, died A. A. C. 1313; and was succeeded by Perseus, his grandson, who transferred the seat of government to Mycenæ, 544 years from the first year of Inachus, in the reign of Cecrops II. king of Athens, and about the time when Pelops the son of Tantalus king of Phrygia, having been compelled by Ilus, to leave his native country, came into Greece, with great wealth, and acquired supreme power in the region afterwards called by his name. In the 37th year of Eurytheus, grandson of Perseus, the Argonautic expedition happened. A. A. C. 1214. This unjust and tyrannical prince had assigned to Hercules his tasks; and

After the death of that hero, he banished all his children. These were the Heraclidæ who fled to Athens for protection, and who returned to Peloponnesus, 40 years after the destruction of Troy. In the reign of Agamemnon, the Trojan war commenced; and it was carried on with vigour, during the space of ten years. In A. A. C. 1184, Troy was taken, and the war was concluded.—scarcely had the Grecians settled in their own country, after their return from this dangerous expedition, when the posterity of Hercules invaded Peloponnesus, took possession of it, and divided it among themselves. Here the kingdom of Mycenæ ended, and that of Sparta was established on its ruins. See SPARTA.

ARGEMA, or } in medicine, an ulcer about
ARGEMON, } the *iris* of the eye, comprehending part of the white, and part also of the black. The argemon appears of a red colour, on the outside of the *iris*, and white within it. When it spreads far, and eats deep, it sometimes occasions the uvea to fall.

ARGEMONE, PRICKLY POPPY: A genus of the monogynia order, belonging to the polyandria class of plants; and in the natural method ranking under the 27th order, Rhæadææ. The corolla consists of six petals; the calyx is triphyllous: and the capsule is semivalved. Of this genus there are 3 species, which are common in many parts of the West Indies, and called by the Spaniards the *devil's fig*; but they are of no use, and have very little beauty.

ARGEMONION, in botany, a name given by some of the late Greek writers, to the plant called *argemolla*, by the other writers of their times.

ARGENCES, a town of France, in the department of Calvados, 10 miles E. of Caen, seated on the Meance. Long. o. 10. W. Lat. 49. 15. N.

(1.) * ARGENT. *adj.* [from *argentum*, Lat. silver.] 1. The white colour used in the coats of gentlemen, knights, and baronets, supposed to be the representation of that metal.—

Rinaldo flings

As swift as fiery light'ning kindled new,

His *argent* eagle with her silver wings

In field of azure, fair Erminia knew. *Fairfax.*

In an *argent* field, the god of war

Was drawn triumphant on his iron car. *Dryd.*

2. Silver; bright like silver.—

Those *argent* fields more likely habitants,

Translated saints, or middle spirits hold,

Betwixt th'angelical and human kind. *Milton.*

Or ask of yonder *argent* fields above,

Why Jove's satellites are less than Jove. *Pope.*

(2.) ARGENT, in heraldry, by itself, is used to signify purity, innocence, beauty, and gentleness; but according to G. Leigh, it signifies, when compounded with

Azure, — Courtesy; Sable, — Religion;

Gules, — Boldness; and

Purple, — Favour; Vert, — Virtue.

ARGENTA, a river of Albania.

ARGENTAC, a town of France, in the department of Upper Vienne, seated on the Dordogne, 15 miles S. E. of Tulle, and 45 N. W. of Aurillac. Long. 2. 3. E. Lat. 45. 5. N.

ARGENTAN, a town of France, in the department of Orne, seated on an eminence, in the

middle of a fertile plain, on the banks of the Orne. It carries on a considerable trade, in corn, fine linen, lawns, gauzes, hats, leather, &c. It is situated 12 miles N. W. of Sees, and 110 W. of Paris. Long. o. 5. E. Lat. 48. 54. N.

ARGENTANGINA, the silver quinsy; a disease to which a lawyer is liable, when, being feed by both parties, he pretends, while pleading at the bar, to be suddenly taken ill, in order to favour his client's opponent.

(1.) ARGENTARIA, a town of ancient Gaul; supposed to have been situated where COLMAR now stands. It is remarkable for a great victory gained by the emperor Gratian over the Lentiens, in May, A. D. 378. The Romans being but few in number, were at first overpowered, and obliged to give ground; but soon returning to the charge, they gained in the end a complete victory; 30,000 barbarians, with their king Triarius being killed on the spot; and all the rest, except 5000, taken prisoners.

(2.) ARGENTARIA CRETA, silver chalk, in natural history, a very beautiful earth, of a loose friable texture, and perfectly white. It is not properly a chalk, but a species of *tripela*; dug in Prussia, and is much esteemed for cleaning plate. It has also been found in France, and of late in Ireland. The species dug in Mantua, is much used by painters, and at Rome is vulgarly called *gesso*.

(1.) ARGENTARIUS, in civil law, one who adorned military arms with silver or gold.

(2.) ARGENTARIUS, in Roman antiquity, a money changer or banker. The argentarii were monied people, who made a profit either by the changing, or lending of money at interest. They had their *tabernæ*, or offices, in the *Forum Romanum*, built there as early as the reign of Tarquin I. The argentarii and *foeneratores* were hated for their covetousness and extortion.

(3.) ARGENTARIUS, in writers of the middle age, an officer entrusted with the custody of money. In this sense *argentarius* amounts to the same with the Greek *αργυροφύλαξ*, and our *cashier*.

(4.) ARGENTARIUS MILES, in our old writers, an officer of the exchequer, whose business it was to carry up the bag of money from the lower exchequer to the higher, in order to its being examined or told.

ARGENTARO, MONTE, a cape and promontory of Italy, on the coast of Tuscany, 12 miles S. of Orbitello. It juts out into the sea like a peninsula, and is a useful land mark.

ARGENTATI MILITES, in antiquity, and mentioned by Livy, (*lib. vi.*) are distinguished from *aurati*. Aquinas supposes these to have been similar to the *argyraspides* and *chrysalpides*; but the descriptions do not quadrate. Livy only represents the argentati as clothed in white linen coats.

* ARGENTATION. *n. s.* [from *argentum*, Lat. silver.] An overlaying with silver. *DiB.*

ARGENTEUIL, a town of the Isle of France, seated on the Seine, five miles N. W. of Paris.—It is a beautiful place, with fine vineyards. In the environs are quarries of stucco. In the ci-devant Benedictine priory, they pretend to have the

N n p a

seamless

seamless coat of Christ. Long. 2. 28. E. Lat. 48. 52. N.

ARGENTEUM *os*, in natural history. See *OS ARGENTEUM*.

ARGENTICOMUS, among ancient astrologers, denotes a kind of silver haired comet, of uncommon lustre, supposed to be the cause of great changes in the planetary system.

ARGENTIERA, or } a small island in the
(1.) ARGENTIERE, } Archipelago, near
Milo, so named from its silver mines. It is about 28 miles in circumference, full of barren mountains, producing nothing but barley, cotton, and a few grapes, fit only for eating. The barley and cotton are sown round the only village in the island. The ladies are handsome, have no other employment but making cotton stockings, and take up with the sailors who put into the port.—The men all frequent the sea, and in time become good pilots. They have little religion, are very ignorant, and of bad morals. Justice is administered by an itinerant *cadi*, who is sometimes the only mussulman in the whole island. It produces the *TERRA CIMOLIA*, so highly esteemed by the ancients. See *CIMOLIA*. Long. 23. 10. E. Lat. 36. 50. N.

(2.) ARGENTIERE, a town of France, in the department of Ardeche, 5 miles S. W. of Aubenas, and 17 W. of Viviers. Long. 4. 22. E. Lat. 44. 30. N.

ARGENTIL, an old English name for the plant called *persicaria Anglorum*; in English, parsley pie-ert, or parsley break-stone. See *APHANES*.

(I.) ARGENTINA, in botany, a medicinal plant, nearly resembling cinquefoil, of some use as a cooler and astringent.

(II.) ARGENTINA, in ichthyology, a genus of fishes belonging to the order of abdominales.—The generic characters are these: The teeth are in the tongue, as well as the jaws; the branchiostegic membrane has eight radii or rays; the anus is near the tail; and the belly fins consist of many rays. There are two species of *argentina*, viz.

1. ARGENTINA CAROLINA has likewise 15 rays in the fin near the anus; the tail is forked, and the lateral lines are straight. It inhabits the fresh waters of Carolina.

2. ARGENTINA SPHYRÆNA has 15 rays in the fin at the anus; the air bladder of this species is conical on both sides, and shines like silver: false pearls are sometimes made of it.

(III.) ARGENTINA. See ARGENTORA.

ARGENTINE, a town of France, in the department of Mont Blanc.

ARGENTINUS, a deity worshipped by the ancients, as the god of silver coin; as *Æsculapius*, whom they made his father, was the god of brass money, which was in use before silver.

ARGENTON, a town of France, in the department of the Indre. It is divided into two by the river Creuse. It had formerly a castle; but it was demolished by Lewis XIV. Long. 1. 38. E. Lat. 46. 36. N.

ARGENTORA, } an ancient city of the
ARGENTORATUM, } Tribocci, called also
ARGENTORATUS, } ARGENTINA. It was one of the 50 forts built by Drusus on the Rhine. The name was formed by the Romans from the

German, *Argen Strassen*, or *Straten*, “unsafe roads for travellers,” from the marauding parties of the garrisons that infested the roads. It is now called *Strasbourg*, and is comprehended in the department of the Lower Rhine; being seated on the rivulet Ill, near the Rhine. See *STRASBURG*. Long. 7. 35. E. Lat. 48. 38. S.

ARGENTUM. See *SILVER*.

ARGENTUM ALBUM, in our old customs, silver coin, or pieces of bullion that anciently passed for money. By Doomsday tenure, some rents to the king were paid in *argento albo*, common silver pieces of money: other rents in *libris argenti et per satis*, in metal of full weight and purity: in the next age, that rent which was paid in money, was called *blanch farm*, and afterwards *white rent*; and what was paid in provisions, was termed *black mail*.

ARGENTUM DEI, GOD'S PENNY, anciently signified earnest-money, or money given to bind a bargain; in some places called *erles*, or *arles*, and by the civilians and canonists, *arrba*. *Et cepit de predicto Henrico tres denarios de argenti Dei per manibus*.

ARGENTUM MOSAICUM, or } a mass consist-

ARGENTUM MURIVUM, } ing of silver-ite. flakes, used for the colouring of plaster-figures, and for other purposes, as pigment. It consists of an amalgam of equal parts of tin, bismuth, and mercury. It is to be mixed with white of egg, or spirit varnish, and then applied to the intended work, which is afterwards to be burnished.

ARGENTUM VIVUM, mercury or quicksilver. See *MERCURY*, and *CHEMISTRY*, INDEX.

ARGESTES, is used by Vitruvius for the wind which blows from that quarter of the horizon, which is 75° from the south, and westward. Rhiccius uses the term to denote the wind which blows at 23° 30' from the west towards the north, coinciding with that which is commonly called *west-north-west*.

ARGETENAR, in astronomy, a star of the fourth magnitude, in the flexure of the constellation Eridanus.

ARGHOLME, a village in Lancashire, near Cartmel.

ARGIA, in the mythology, 1. the wife of La-chus, and mother of Io, or Isis: 2. the daughter of Adrastus, wife of Polynices; and mother of Therfander, one of the Epigoni: 3. the mother of Argus, the carpenter of the ship Argo.

ARGIA AMPHILOCHUS. See ARGOS AMPHILOCHICUM.

(1.) ARGIL, in ornithology, a species of ardea. See *ARDEA*, N° H. § 2.

(2.) * ARGILL. *n. f.* [*argilla*, Lat.] Potter's clay; a fat soft kind of earth, of which vessels are made.

(3.) ARGIL, or } in natural history. See *CLAY*.
ARGILLEA, }

* ARGILLACEOUS. *adj.* [from *argil*.] Clayey; partaking of the nature of argil; consisting of argil, or potter's clay.

ARGILLACEOUS EARTHS, such as form with water a tenaceous paste, or soft stones; they burn hard, are corroded by strong coction in the concentrated mineral acids, but not acted upon by moderate digestion. They are the basis of earthen
ways

waves. They vitrify with salts, with arsenic, with gypsum, and difficultly with lead.

* ARGILLOUS. *adi.* [from *argil.*] Consisting of clay; clayish; containing clay.—Albuquerque derives this redness from the sand and *argillous* earth at the bottom. *Brown's Vulgar Errours.*

ARGIPPA. See ARGOS HIPPIUM, N° 2.

ARGIVES, } the people of Argeia. See ARGÆI.

ARGIVI, } Also a name for the Greeks in general.

(1.) ARGO, in fabulous history, the ship, celebrated by the poets, wherein the Argonauts, of whom Jason was the chief, sailed in quest of the golden fleece. Jason having happily accomplished his enterprise, consecrated the ship Argo to Neptune; or, as others say, to Minerva, in the isthmus of Corinth; where they add, it did not remain long before it was translated into heaven, and made a constellation. The generality of authors represent the ship Argo as of a long make, resembling the modern galleys; and furnished with 30 benches of rowers. It could not, however, be of any great bulk, since the Argonauts were able to carry it on their backs from the Danube to the Adriatic sea. See ARGONAUTS, N° I, 1—3.

(2.) ARGO, or ARGO NAVIS, in astronomy, the ship Argo, is a constellation in the southern hemisphere, whose stars, in Ptolemy's catalogue, are 15; in Tycho's, 11; in the Britannic catalogue, and Sharp's appendix, 64.

(3.) ARGO. See ARGONAUTA, N° 1.

ARGOB, in ancient geography, a canton lying beyond Jordan, in the half tribe of Manasseh, and in the country of Bashan, one of the most fruitful on the other side of Jordan. In the region of Argob there were 60 cities, called *Bashan-bavotb*, which had very high walls and strong gates, without reckoning many villages and hamlets which were not inclosed, Deut. iii. 4. 14. and Kings iv. 13. The capital city of the region of Argob, which Eusebius says was 15 miles W. from Gerasa.

ARGOIL, clay. *Cbauc.* See ARGIL, N° 2.

(1.) ARGOL, or ARCHIL. See ARCHIL.

(2.) ARGOL, or ARGAL, tartar. See ARGAL.

ARGOLETIERS, light armed horsemen.

ARGOLIS. See ARGÆIA.

ARGONAUTA, the name of a species of shell-fish belonging to the order of *vermes testacea*. The shell consists of one spiral involuted valve. There are two species, viz.

1. ARGONAUTA ARGO, with a subdented carina, is found in the Mediterranean and Indian oceans. This is the famous *nautilus* of authors. The shell seems no thicker nor stronger than a piece of paper; and the fish that inhabits it is a lepu. It has been imagined that men first learned the method of sailing in vessels from what they saw practised by this creature. When it is to sail, it extends two of its arms on high; and between these supports a membrane, which it throws out on this occasion: this serves for its sail; and the two arms it hangs out of the shell, to serve occasionally either as oars or as a steerage; but this last office is generally served by the tail. When the sea is calm, it is common to see numbers of these creatures diverting themselves with sailing a-

bout in this manner; but as soon as a storm rises, or any thing gives them disturbance, they draw in their legs, and take in as much water as makes them somewhat heavier than the sea-water in which they swim, and they then sink to the bottom. The manner of their voiding this abundant water, when they would rise again, is by a number of holes, of which their legs are full.

2. ARGONAUTA CYMBIUM has a blunt plaited carina. This species is very small, and is found in the Mediterranean.

ARGONAUTIC, something belonging to the Argonauts. The argonautic expedition is one of the great epochs, or periods of ancient history, which Sir Isaac Newton endeavours to settle, and from thence to rectify the ancient chronology. This he shows, by several authorities, to have been one generation, or about 30 years earlier, than the taking of Troy, and 43 years later than the death of Solomon. See CHRONOLOGY. Dr Bryant, however, rejects the history of the Argonautic expedition as a Grecian fable, founded on a tradition derived from Egypt, and ultimately referring to Noah's preservation, &c. in the ark. But although we are not to believe all the romantic stories which poets, and even some grave historians, have told us of those famous adventurers, yet it seems unreasonable to discredit entirely the Argonautic expedition. See ARGONAUTS, N° I. § 2 and 3.

ARGONAUTICA, in literary history, poems on the expedition of the Argonauts. We have the *Argonautics* of Orpheus in epic verse, published by H. Stephens; the *Argonautics* of Apollonius Rhodius, an heroic poem, consisting of 4 books, "a work," as Quintilian says, "by no means contemptible;" and the *Argonauticon* of Valerius Flaccus, in 8 books of Latin heroics, in imitation of Apollonius; with respect to which Burman observes, that the imitator has often surpassed the original.

(I. 1.) ARGONAUTS, in antiquity, a company of 51 heroes, according to Valerius Flaccus, or, according to Apollonius Rhodius, of 44, who embarked along with Jason in the ship ARGO, for Colchis, to obtain the golden fleece. But Julius Hyginus, who gives a list of them with their genealogies, enumerates no fewer than 69 Argonauts. Hercules, Theseus, Castor, Pollux, Amphion, Telamon, Meleager, &c. were of the number. Calais and Zethus, the sons of Boreas, who were said to have had wings at their head and feet, were their pilots. Jason, according to the fable, before he could obtain the golden fleece, had to engage its guardians, a monstrous dragon, and 2 bulls with brazen feet, which breathed fire from their nostrils: all which prodigies he performed by the help of Medea, daughter of Æetes king of Colchis, and carried off both the fleece and the princess!

(2.) ARGONAUTS, EXPEDITION OF THE, EXPLAINED. The occasion of this expedition is thus represented by Greek writers. Phryxus, flying with his sister Helle from the rage of their step-mother Ino, the daughter of Cadmus, went on board a ship, whose ensign was a golden ram, and sailed to Colchis, now Mingrelia, part of Georgia. Helle was drowned by the way, in that sea which from her was called the *Hellepont*; now the *Dardanelles*.

[illegible]

er has great affinity with the ivy; but differs in the nectarium, and perhaps in the fruit.

(I.) ARGOS, an ancient name of Peloponnesus; so called from Argus, one of its kings.

(II. I.) ARGOS, an inland town, and the capital of Argolis or ARGEIA. It had different epithets; as ACHAICUM, from the country, or the original people; HIPPIUM, from its breed of horses; and INACHIUM, from the river Inachus, which runs by, or from Inachus the founder of the kingdom, whose name was given to the river; and whose queen Argia, gave name to the country, Argeia. The Argives related, that Inachus was one of the river gods who adjudged the country to Juno, when she contended for it with Neptune, which deity in return made their water to diminish; the reason why the Inachus flowed only after rain, and was dry in summer. The source was a spring, not copious, on a mountain in Arcadia, and the river served there as a boundary between the Argives and Mantineans.

(2.) ARGOS, ANCIENT DESCRIPTION OF. Argos stood chiefly on a flat. The springs were on the surface; and it abounded in wells, which were said to have been made by the daughters of Danaus. This ancient personage lived in the acropolis or citadel, which was named *Larissa*, and accounted moderately strong. On the ascent was a temple of Apollo on the ridge, which in the antiquity continued the seat of an oracle. The woman who prophesied was debarred from commerce with the male sex. A lamb was sacrificed once a month, in the night, when, on tasting of its blood, she became possessed with the divinity. Further on was a stadium, where the Argives celebrated games in honour of Nemean Jupiter and Juno. On the top was a temple of Jupiter, without a roof, the statue off the pedestal. In the temple of Minerva, among other curious articles, was a wooden Jupiter, with an eye more than common, having one in the forehead. This statue, it was said, was once placed in a court of the palace of Priam, who fled as a suppliant to the altar before it, when Troy was sacked. In this city was also the brazen tower in which Danaë, the daughter of king Acrisius, being confined here by her father, was destroyed by Jupiter, or was probably one of his priests.

(3.) ARGOS, PRESENT STATE OF. Argos retains its original name and situation, standing near the mountains which are the boundary of the plain, with Napoli di Romania, and the sea in view before it. The shining houses are whitened with lime or plaster. Churches, mud-built cottages and walls, with gardens and open areas, are interspersed, and the town is of considerable extent. Above the other buildings a very handsome mosque is seen, shaded with cypruses; and behind is a lofty hill, brown and naked, of a conical form, the summit crowned with a neglected castle. The ravastations of time and war have effaced the old city. We look in vain, says Mr Chandler, for vestiges of its numerous edifices, the theatre, the gymnasium, the temples, and monuments, which once boasted, contending even with Athens in antiquity and in favours conferred by the gods. It is situated 25 miles S. of Corinth. Long. 1. 31. Lat. 56. 51. N. according to some; but Mr

Walker places it in Long. 23. 5. E. and Lat. 37. 30. N.

(III.) ARGOS, [*αργος*, from *α* negative, and *εργον*, work, or business; as if it were *αεργος*,] any thing not prepared. Thus *αεργος αεργος* is silver not worked; *αεργον σιτον*, in Hippocrates, is crude wheat, not prepared, but such as it is taken from the floor.

ARGOS ACHAICUM. See ARGOS, No. II. § 1.
ARGOS AMPHILOCHICUM, a city of Acarnania, situated on the E. side of the Sinus Ambracius 180 stadia S. E. of Ambracia. It was so named from AMPHILOCHUS the son of Amphiaraus, and ARGOS, his country. See No. 1. It was also called ARGIA AMPHILOCHIS, and AMPHILOCHIA.

(1.) ARGOS HIPPIUM. See ARGOS, No. II. § 1.

(2.) ARGOS HIPPIUM, an ancient name of Arpi; afterwards called *Argrippa*, and *Argippa*; built by Diomedes, on the Cerbalus. It was a large and populous city of Apulia; and is now called ARPI, but in ruins.

ARGOS INACHIUM. See ARGOS, No. II. § 1.

ARGOS PELASGICUM, Thessaly; so called from the Pelasgi.

ARGOS PORTUS, a port of Tuscany; now called PORTO FERRARO, in the N. of the island Elba. Long. 11. 30. E. Lat. 42. 35.

ARGOSIES. See ARGOSY.

ARGOSTOL, or } a sea port of Cephalonia,
ARGOSTOLI, } opposite to Albanica. It is the best harbour in the island. It is 5 miles distant from the fortress, where the proveditor resides.

* ARGOSY. *n. s.* [derived by Pope from *Argo*, the name of Jason's ship; supposed by others to be a vessel of *Ragusa* or *Ragosa*, a *Ragazine*, corrupted.] A large vessel for merchandize; a carrack.

Your mind is tossing on the ocean;
There where your *argosies* with portly sail,
Like signiors and rich burghers on the flood,
Do overpeer the petty traffickers.

Shakesp. Merch. of Venice.

ARGOW, or AARGOW, a county of Switzerland, seated on the Aar, whence its name.

* (1.) To ARGUE. *v. a.* 1. To prove any thing by argument.—

If the world's age and death be *argued* well,
By the sun's fall, which now towards earth doth bend,

Then we might fear that virtue, since she fell
So low as woman should be near her end.

Donne.

2. To debate any question; as, to *argue* a cause.

3. To prove, as an argument.—

So many laws *argue* so many sins

Among them: how can God with such reside?

Milton.

—It *argues* distemper of the mind as well as of the body, when a man is continually tossing from one side to the other. *South.*—This *argues* a virtue and disposition in those sides of the rays, which answers to that virtue and disposition of the chrystal. *Newton's Opticks.* 4. To charge with, as a crime: with *of*.—I have pleaded guilty to all thoughts and expressions of mine, which can

can be truly *argued* of obscenity, profaneness, immorality, and retract them. *Dryden's Fables*.—The accidents are not the same, which would have *argued* him of a servile copying, and total barrenness of invention; yet the seas were the same. *Dryden's Fables*.

* (2.) To ARGUE. *v. a.* [*arguo*, Lat.] 1. To reason; to offer reasons.—

I know your majesty has always lov'd her
So dear in heart, not to deny her what
A woman of less peace might ask by law;
Scholars allow'd freely to *argue* for her.

Shakesp. Hen. VIII.

—Publick *arguing* oft serves, not only to exasperate the minds, but to whet the wits of hereticks.

Decay of Piety.—An idea of motion, not passing on, would perplex any one, who should *argue* from such an idea. *Locke*. 2. To persuade by argument.—It is a sort of poetical logick which I would make use of, to *argue* you into a protection of this play. *Congr. Ded. to Old Bat.* 3. To dispute; with the particles *with* or *against* before the opponent, and *against* before the thing opposed.—Why do Christians, of several persuasions, so fiercely *argue against* the salvability of each other? *Decay of Piety*.—He that by often *arguing against* his own sense, imposes falsehoods on others, is not far from believing himself. *Locke*.—I do not see how they can *argue with* any one, without setting down strict boundaries. *Locke*.

* ARGUER. *n. s.* [from *argue*.] A reasoner; a disputer; a controvertist.—Men are ashamed to be proselytes to a weak *arguer*, as thinking they must part with their reputation as well as their sin. *Decay of Piety*.—Neither good Christians nor good *arguers*. *Atterbury*.

ARGUIM, or } an island on the coast of A-
(I. 1.) ARGUIN, } frica, about 16, or as others
say, 30 miles from Cape Blanco, scarce two miles
in length; notwithstanding of which, it was a
bone of contention for 87 years between the Por-
tuguese, Dutch, English, and French; and, after
a variety of fortune, has at last been totally aban-
doned. Long. 17. 20. W. Lat. 20. 30. N. according
to Walker; but others place it in Long. 3. 20. E.

(2.) ARGUIN, HISTORY OF. This island was
first discovered by the Portuguese in 1444, when
a fleet bound to the east touched at Arguim, and
from some little trade carried on with the natives,
it was imagined that a settlement there might be
of some advantage to Portugal. A fort was ac-
cordingly erected on the island, and the Portuguese
enjoyed the peaceable possession of it till 1638.
At this time, the Dutch having received a minute
account of the condition of the island, resolved to
attack it; and accordingly landed without molesta-
tion from the garrison, which was too weak to
oppose them. The Portuguese, however, defend-
ed themselves with great intrepidity, and at last
surrendered upon honourable terms. The Dutch
immediately set about repairing the fortifications,
and securing it in the best manner they could:
however, in 1665, the fort was reduced almost to
a heap of rubbish by an English squadron; but as
the fortifications were totally destroyed, and only
a small garrison left there, it was easily retaken
by the Dutch the next year. They now redoubled

their diligence in strengthening the island, entering
into alliance with Moorish chiefs, procuring a
number of families to settle under protection of
the fort, and giving extravagant prices for gum,
in order to monopolize the gum trade. By this
means the gum trade of the French Senegal com-
pany was almost entirely destroyed; upon which
they fitted out a squadron, dispossessed the Dutch,
and had the island finally ceded to them by the
treaty of Nimeguen. Though the Dutch now
seemed finally to be expelled, they resolved not to
part so easily with such a valuable settlement.
Under pretence of being subjects of the Elector
of Brandenburg, therefore, they erected one of
the forts which had been demolished, and there
maintained themselves in spite of the utmost re-
deavours of the French company to dispossess
them. Numberless were the memorials, protests,
rescripts, &c. which were published on this oc-
casion, till a new war in 1701 put an end to
them. In 1717, however, the French company
having found all their remonstrances ineffectual,
fitted out a new squadron; but this armament
did not arrive at Arguim before February 25th,
1721. The Dutch defended themselves with such
intrepidity as had almost baffled the utmost efforts
of the French; but the latter having drawn off a
Moorish chief from his alliance, the Dutch were
obliged to evacuate Arguim, and retire to Por-
todic, where they fortified themselves, determining
to watch a favourable opportunity for recovering
their settlement at Arguim. This soon occurred,
by the imprudence of Duval the French director,
who having quarrelled with the Moors, was sur-
prised, defeated, and killed by them; in conse-
quence of which, the settlement fell again into the
hands of the Dutch on the 11th of June 1722. In
1723, the Dutch were attacked by another French
squadron under the command of the Sieur Ro-
guadiere, who boasted that the fort could not
hold out one day; but though he prevailed so far
as to get possession of the cisterns which contain-
ed the water of the besieged, he was at last shame-
fully repulsed, and forced to raise the siege with
precipitation. The Dutch, however, did not long
enjoy the possession which they had so bravely
defended; for, in 1725, their fort was entirely
demolished by the French under Du Cassé, and
has never since been rebuilt by any European na-
tion.

(II.) ARGUIN, a river in the isle of Arguin.

(1.) * ARGUMENT. *n. s.* [*argumentum*, Lat.]
A reason alledged for or against any thing.—We
sometimes see, on our theatres, vice rewarded, at
least unpunished; yet it ought not to be an *argu-
ment* against the art. *Dryden*.—When any thing is
proved by as good *arguments* as that thing is cap-
able of, supposing it were; we ought not in rea-
son to make any doubt of the existence of that
thing. *Tillotson*.—Our authour's 'two great and
only *arguments* to prove, that heirs are lords over
their brethren. *Locke*. 2. The subject of any dis-
course or writing.—

That she who ev'n but now was your best
object,

Your praise's *argument*, balm of your age,
Dearest and best.

Shakesp. King Lear.

To the height of this great *argument*
I may assert eternal providence,
And justify the ways of God to man. *Milton.*
Sad task! yet *argument*
Not less, but more heroick than the wrath
Of stern Achilles. *Milton.*

A much longer discourse my *argument* requires;
your merciful dispositions a much shorter. *Spratt's*
Sermons. 3. The contents of any work summed
up by way of abstract.—The *argument* of the
work, that is, its principal action, the economy
and disposition of it, are the things which distin-
guish copies from originals. *Dryden.* 4. A con-
trovery.—

This day, in *argument* upon a case,
Some words there grew 'twixt Somerset and
me. *Shakespeare.*

An *argument* that fell out last night, where each
of us fell in praise of our country mistresses.
Shakeff. Cymbeline.—If the idea be not agreed on
betwixt the speaker and hearer, the *argument* is
not about things, but names. *Locke.* 5. It has
sometimes the particle *to* before the thing to be
proved, but generally *for*.—The best moral *argu-*
ment to patience, in my opinion, is the advantage
of patience itself. *Tillotson.*—This, before that re-
velation had enlightened the world, was the very
best *argument* for a future state. *Atterbury.* 6.
[In astronomy.] An arch, by which we seek ano-
ther unknown arch, proportional to the first.
Combers.

(2.) ARGUMENT, in literature. See No 1. Def.
1, and 3; and SYLLABUS.

(3.) ARGUMENT, in logic and rhetoric, an in-
ference drawn from premises, the truth of which
is indisputable, or at least highly probable. See
LOGIC.

ARGUMENT OF INCLINATION, in astronomy,
is an arch of a planet's orbit intercepted between
the ascending node, and the place of the planet
from the sun, numbered according to the successi-
on of the signs.

ARGUMENT OF THE MOON'S LATITUDE is
the distance of the moon's true place from the
m's. By this we find the quantity of the real
obscuration in eclipses, or how many digits are
darkened in any place.

* ARGUMENTAL. *adj.* [from *argument*.] Be-
longing to argument; reasoning.—

Afflicted sense thou kindly dost set free,
Oppress'd with *argumental* tyranny,
And routed reason finds a safe retreat in thee.

Pope.

(1.) * ARGUMENTATION. *n.s.* [from *argu-*
ment.] Reasoning; the act of reasoning. *Argumen-*
tation is that operation of the mind, whereby we
infer one proposition from two or more proposi-
tions premised. Or it is the drawing a conclusion,
which before was unknown, or doubtful, from
some propositions more known and evident; so
when we have judged that matter cannot think,
and that the mind of man doth think, we con-
clude, that therefore the mind of man is not mat-
ter. *Watts's Logick.*—I suppose it is no ill topick
of *argumentation*, to shew the prevalence of
contempt, by the contrary influences of re-
spect. *South.*—His thoughts must be masculine,
full of *argumentation*, and that sufficiently warm.
VOL. II. PART II.

Dryden.—The whole course of his *argumentation*
comes to nothing. *Addison.*

(2.) ARGUMENTATION, according to Cicero,
is the delivering or unfolding of an argument.—
The matter of argumentations is propositions;
the form, their due disposition, with regard to
one another, so as a conclusion may be drawn from
them. See ENTHYME, INDUCTION, PROPO-
SITION, RATIOCINATION, SORITES, SYLLOGISM,
&c.

* ARGUMENTATIVE. *adj.* [from *argument*.]

1. Consisting of argument; containing argument.
—This omission, considering the bounds within
which the *argumentative* part of my discourse was
confined, I could not avoid. *Attenb. Pref. to his*
Sermons. 2. Sometimes with *of*, but rarely.—A-
nother thing *argumentative* of providence is, that
pappous plumage growing upon the tops of some
seeds, whereby they are waisted with the wind,
and disseminated far and wide. *Ray.* 3. Applied
to persons; disputations; disposed to controversy.

ARGUMENTUM AD HOMINEM, is to press a
man with consequences, drawn from his own
principles and concessions.

ARGUMENTUM AD JUDICIUM, an argument
addressed to the judgment, drawn from any foun-
dation of knowledge or probability. Mr Locke
reckons this the best species of argument.

ARGUMENTUM A TUTO, an argument drawn
from the consideration, that it is *more safe* to
choose the one side of a question than the other;
where the evidence seems doubtful or nearly equal
on both sides. This species of argument is said
to have been first used by Arnobius, and has been
since successfully adopted by Pascal, Tillotson,
Gastrel, and other advocates for Christianity, a-
gainst Deists and Atheists; who, while they en-
deavour to undermine our faith in the gospel, and
our hopes arising from it, give us nothing safe or
certain in its place.

ARGUMENTUM BACULINUM literally signifies
a cudgelling or knock-him-down argument; and is
applied in cases where compulsion is used instead
of reasoning. Every species of persecution for
opinions, whether religious, political, or philoso-
phical, may be termed an *argumentum baculinum*.

(1.) ARGUN, a city of Asiatic Tartary, feat-
ed on the ARGUN. (See No 2.) There are mines
of silver and lead near it. Long. 103. 56. E. Lat.
42. 30. N. or as others have it, Long. 104. 5. E.
Lat. 51. 36. N.

(2.) ARGUN, a river of Asiatic Russia, which
separates the empires of Russia and China, and
falls into the Amur.

(1.) ARGUS, in fabulous history, was the son
of Aristor, and had 100 eyes, 50 of which were
always open. Juno made choice of him to guard
Io, whom Jupiter transformed into a white heifer;
but Jupiter, pitying Io for being so closely con-
fined, sent Mercury, who, with his flute, charmed
Argus to sleep, sealed up his eyes with his cadu-
ceus, and then cut off his head; when Juno, to
reward his fidelity, turned him into a peacock,
and placed his eyes in his tail.

(2.) ARGUS, in ornithology, a species of phea-
sant in Chinese Tartary.

(3.) ARGUS, in zoology, a kind of animal full
of eyes, called in Iceland *escaicern*: of which
Wormius

Wormius and Jacobus have given descriptions. It is of the testaceous kind, of an oblong form, resembling a crab's tail, and about two fingers breadth in length.

(4.) ARGUS, the son of Jupiter and Niobe, the founder and first king of Argos.

(5.) ARGUS, the son of Polybus and Argia, the carpenter and ship-master of the ARGO.

ARGUS-SHELL, in conchyliology, a species of porcelain shell, beautifully variegated with spots, resembling those in a peacock's tail.

ARGUTATION, a proving by argument; a disputing for and against. This is the definition given by Dr Johnson, in the former edition of his Dictionary, but he has omitted the article altogether in his last edition.

* ARGUTE. *adj.* [*argute*, Ital. *argutus*, Lat.] 1. Subtle; witty; sharp. 2. Shrill.

ARGUTIÆ, witty and acute sayings, which commonly signify something further than what their mere words seem to import. Writers on rhetoric speak of divers species of argutiæ, viz.

1. ARGUTIÆ AB ALIENO, when something is said, which seems repugnant either to the nature and property of a thing, or to common custom, the laws, &c. which yet in reality is consistent therewith; or when something is given as a reason of another, which yet is not the reason of it.—For instance, *Si Caius nihil didicisset, errasset minus*; “If Caius had learned nothing, he had erred less:” or *Aureum hoc sæculum est, quia plurimus jam auro bonus venit*; “This is the golden age, for now much honour is acquired by gold.”

2. ARGUTIÆ AB ALLUSIONE, those wherein allusion is made to some history, fable, sentence, proverb, or the like: e. g. *Multi umbram captant et carnem amittunt*; “Many catch at the shadow and lose the substance.”

3. ARGUTIÆ A COMPARATIS, when two things are compared together, which yet at first sight appear very different from each other, but so as to make a pretty kind of simile or dissimile; e. g. *Par est pauper nil cupiens principi omnia habenti*; “The poor man, who desires nothing, is as happy as the prince who has every thing.”

4. ARGUTIÆ A REPUGNANTIBUS, when two things meet in a subject, which yet regularly cannot be therein; or when two things are opposed to each other, yet the epithet of the one is attributed to the other; e. g. *Dum tacent clamant*; “While silent, they proclaim.”

ARGYLE, or } a county of Scotland, bound-
(1.) ARGYLL, } ed on the S. by the Irish Sea
and the Frith of Clyde; on the E. by the coun-
ties of Perth and Dumbarton; on the N. E. by
Lochaber; and on the N. W. by several islands.
It extends in length from S. to N. between the
Mull of Kintyre and the point of Ardnamurchan,
where it joins Inverness-shire, about 114 miles;
and in breadth in some places, including the isles,
to 70. It was anciently called ARGATHELIA, and
together with Perthshire and the Western Islands,
constituted the ancient kingdom of the Scots,
while the rest of Caledonia was subject to the
Picts and Romans. It comprehends Kintyre,
Knappdale, Argyle Proper, Cowal, and Lorn.—
This country, like most other parts of the High-
lands, affords a very wild prospect of hills, rocks,

huge mountains, and tremendous precipices, piled upon each other, in a stupendous manner; bare, bleak, and barren to the view; or at best covered with shagged heath, which appears black and dismal, except in summer, when it is variegated with an agreeable bloom of a purple colour. The coast of Argyll is rocky; yet indented with bays and inlets, that afford good harbours for shipping. The country is well watered by rivers, brooks, and lakes, abounding with fish; the vales and flat parts of it are cultivated for corn; the mountains feed an innumerable quantity of black cattle, which run wild among the hills in winter, as well as summer; the heath and woods, of which there is a considerable number, afford shelter to deer, roebucks, and all sorts of game in great plenty: the circumambient sea, with its locks, bays, and harbours, pours forth myriads of fish; but the innate wealth of the country is dug from the bowels of the mountains in iron, copper, lead, and other metals and minerals. Argyle is the seat of a provincial synod, consisting of five presbyteries and 49 parishes.—Argyleshire is in general peopled by the clan of Campbell; and affords a great number of castles and seats belonging to gentlemen who hold of the duke, and boast themselves descended from his family. It sends one member to parliament.

(2.) ARGYLL, DUKES OF. See CAMPBELL. The ancient and noble family of Campbell, the most powerful of the Scottish nobility, take their titles of duke and earl from this county. The duke of Argyle is, by hereditary right, great master of the king's household in Scotland; admiral of the Western Isles; general of Derwent castle; keeper of Dunstaffnage and Carrick; and, before the jurisdictions were abolished, enjoyed other hereditary offices, which rendered him too powerful as the subject of a limited monarchy.—He still possesses many royalties; his vassals, even of the name of Campbell, are so numerous, and his influence extends so far, that he could, on occasion, bring 3000 or 4000 fighting men into the field.

(3.) ARGYLL, IMPROVEMENTS OF. Mr Robson, in his General View of this county, drawn up for the Board of Agriculture, among other interesting particulars, mentions that the sheep in the western part of it are very much improved since first introduced;—that an extensive lead mine at Stontian, carried on by an English company, gives employment to about 200 men, and will soon employ 100 more, the ores turning out beyond expectation;—that in some parts there are inexhaustible quantities of rock and shell marle, which, now that the coal duty is taken off, will afford immense resources of employment to many, who have hitherto had no means of bettering their situation, or even of supporting it; that in those parts where the grazing system prevails, it is common for substantial tenants to pay from 20 to 30 guineas for a Highland bull, and from 10 to 15 for the best cows; that the great roads in general are good, and agriculture is in a state of great improvement in many places of the county.” And Mr Knox observed, that when the projected canal shall be completed, and some villages and harbours erected, the populous county of Argyll will become one of

of the most valuable provinces in the British empire. It abounds in black cattle, sheep, and fish, though the latter are less numerous than those on the northern shores. Washed on both sides by the sea, deeply indented by navigable lakes and bays; having an easy communication with the fishing grounds, on the North Highlands; with Glasgow, and the trading towns on the Clyde; with Ireland, Wales, Whitehaven, Liverpool, Bristol, and other marts on the west coast of England, we may easily conceive that the period is at no great distance, when Argyleshire will become a great commercial county. To corroborate this opinion, he observes, that after a vessel gets under sail from this coast, she enters at once into the Atlantic, where she meets with no interruption till she makes the coast of America or the West Indies. The line, therefore, which nature points out for the inhabitants, is, that of salt-making, fishing, ship-building, freights or the carrying trade; soap and glass-making, by means of the kelp upon their shores, and sand found upon Gila island, which is adapted for the latter.

(4.) ARGYLL PROPER is that district of Argyleshire, which is bounded by Knapdale and Cowal on the S.; Lochaber on the N.; Lenox and the Grampian hills on the E.; and Lorne on the W. It lies between Lochfyn and Lochow; which abound with excellent trout and salmon.

ARGYRASPIDES, or ARGYROASPIDES, [from *argyros*, silver, and *aspis*, a shield,] in antiquity, soldiers armed with silver bucklers, or bucklers silvered. This corps, according to Quintus Curtius, were the second of Alexander's army; the phalanx being the first. Justin says, that Alexander having penetrated into India, and extended his empire as far as the ocean; for a monument of his glory, ordered the armour of his soldiers, and the housings of his horses, to be adorned with silver. From his author it should seem, that Alexander's whole army were called argyraspides. After that prince's death, the argyraspides despised all other chiefs of his army, disdaining to obey any other, having remained under Alexander.

ARGYRIPÆ, or } See ARGOS HIPPIUM, N. 2.
ARGYRIPPA. }

ARGYRITÆ AGONIS, in antiquity, games in which money was the prize.

ARGYRITIS, in natural history, a name given by the ancients to a substance resembling silver. In this sense, argyritis was used to signify such lichen as was of a white colour, to distinguish it from that which was yellow, which they dignified with the name of chrysis, as we do at present with that of lithrage gold. The argyritis of modern writers, seems to have been the same with the *lapis magnetis* of the ancients, mentioned by Theophrastus, and distinguished from the magnet.

ARGYRODAMAS, in natural history, a sort of liver coloured talc, which bears the fire, and neither burns, melts, nor changes its hue.

ARGYROGONIA is used by alchemists for a kind of argentific, or silver-making seed, pretended to be procurable from a solution of that metal perfectly concocted!

ARGYROLIBANOS, in the materia medica

or the ancient Greeks, a word used to express the white kind of olibanum.

ARGYROPEA, or } [from *argyros*, silver, and
ARGYROPOEIA, } *poieo*, to make,] in alchemy,
the art of making silver out of imperfect metals.

ARGYRUNTUM, a maritime town of Illyria; now called Novigrad, in Dalmatia. Long. 17. 30. E. Lat. 44. 30.

(1.) ARHUSEN, or AARHUSEN. See AARHUUS, N. 1. To the account there given, we may add, that some geographers state its extent at 60 miles in length, and 30 in breadth.

(2.) ARHUSEN, or AARHUSEN. See AARHUUS, N. 2. Long. 10. 0. E. Lat. 56. 6. N.

(1.) ARIA, [*Ἀρία*, Gr. martial,] one of the ancient names of Thrace, from the character of the people, whose country Euripides calls the residence of Mars. It was the birth place of Sophocles.

(2.) ARIA and ARIANA, in ancient geography, the names of either one, or two different countries, respecting which geographers are not agreed. Ptolemy mentions only Aria, and says nothing of Ariana. Pliny mentions Ariana, and says nothing about Aria; but distinguishes between Arii and Ariani: Parthia, he says, has the Arii to the E. Carmania and the Ariani to the S. from which it is conjectured, the Ariani extended farther than the Arii, and comprised the Gedrosii and the Drangae. Arrian has only Aria and Arii, and is silent about Ariana. But Strabo gives more extensive bounds to Ariana than to Aria, without particularly defining them: only in general he says, that Ariana begins from India, and quotes Eratosthenes; according to whom, Ariana is bounded by the Indus on the E.; on the S. by the Great Sea; by Paropamisus and the mountains, quite to Portæ Caspia, on the N. and on the W. by the same boundaries by which Parthia is separated from Media, Carmania, Parætacene, and Persia: and thus Ariana is extremely extensive.—Aria has its limits thus described by Ptolemy: On the N. some parts of the Margiana and Bactriana; on the E. the Paropamisidæ; and on the S. the Drangiana. Strabo says, the Arii adjoin to the Paropamisidæ on the W.

(3.) ARIA, or ARIAPOLIS, now called HERAT, in Chorasan, an ancient town situated on the river Arias, which probably gave name to the country Aria.

(4.) * ARIA. *n. f.* [Ital. in musick.] An air, song, or tune.

ARIADNÆA, in Grecian antiquity, two festivals at Naxos, in honour of two women named *Ariadne*. In the solemnity dedicated to one of them, (See ARIADNE,) they had a show of sorrow and mourning; and, in memory of her being left by Theseus near the time of child birth, it was usual for a young man to lie down and counterfeited all the agonies of a woman in labour. This festival is said to have been first instituted by Theseus, to atone for his ingratitude to that princess! The other Ariadne was thought to be of a gay and sprightly temper; and therefore her festival was observed with music and other expressions of mirth and joy.

ARIADNE, daughter of Minos king of Crete. Theseus being sent to destroy the Minotaur, Ariadne was so taken with him, that, as a testimony

thrown by earthquakes. The last and most destructive happened in 1732, and was fatal to all the country along the eastern verge of the Apennines. To secure a retreat in case of future accidents, which from their situation they have every reason to expect, these fathers have constructed a small building of wood, the parts of which being joined together with strong iron chains, are contrived so, as by yielding to the oscillatory motion

17th century. Erasmus seems to have made some measure to reform Arianism at the beginning of the 16th century, so his Commentaries on the New Testament. Accordingly, he was reproached by his adversaries with Arian impiety, and glosses, Arian tenets, &c. To which he made answer, save that there was no heresy more roughly extinct than that of the Ariens. *Valde*
per singula cunctisq; quoniam Arianae. See the

of things was soon changed. Servetus, a Spaniard by nation, published, in 1531, a little treatise against the Trinity, which once more revived the opinions of the Arians in the West. Indeed he rather showed himself a Photinian than an Arian; only that he made use of the same passages of Scripture, and the same arguments against the Saviour, with the proper Arians. Servetus had not, properly speaking, any disciples; but he gave occasion after his death to the forming of a new system of Arianism in Geneva, much more subtle and artful than his own, and which not a little perplexed Calvin. From Geneva the new Arians removed to Poland, where they gained considerable ground; but at length became Socinians. The appellation *Arian* has been indiscriminately applied, in more modern times, to all those who consider Jesus Christ as inferior and subordinate to the Father; and whose sentiments cannot be supposed to coincide exactly with those of the ancient Arians. Mr Whiston was one of the first divines who revived this controversy, in the beginning of the 18th century. He was followed by Dr Clarke, who published his famous book intitled *The Scripture Doctrine of the Trinity*, &c. In consequence of which, he was reproached with the title of *Semi-Arian*. He was also threatened by the convocation and combated by argument. Dr Waterland, who has been charged with verging towards Unitarianism, was one of his principal adversaries. The history of this controversy during the present century may be found in a pamphlet, intitled "An account of all the considerable Books and pamphlets that have been wrote on either side, in the controversy concerning the Trinity, from the year 1712; to the end of 1719." Mr James Purcell, lately deceased, was the last person, who publicly avowed this doctrine in Edinburgh, both by preaching weekly to a small congregation, and by publishing divers tracts on the subject. In England, too, the late Dr Price, was a most eminent advocate for the Arian system. See PRICE.

(3.) **ARIANS, SECTS OF THE.** The Arians were divided into various sects, of which ancient writers give an account under the names of *Semipelagians*, *Eusebians*, *Acicians*, *Eunomians*, *Acicians*, *Galatians*, and others. But they have been commonly distributed into three classes, viz. the *genuine Arians*, *Semi-Arians*, and *Eunomians*.

ARIAPOLIS. See **ARIA**, N° 3.

ARIARATHES, the name of several ancient kings of Cappadocia. The last of them, being overcome by Perdiccas, set fire to his palace, and burnt himself, his family, and effects in it, rather than submit to be carried captive.

ARIAS, ARIUS, or AREIOS, a river, on which Alexandria was seated, and which runs past Alexandria. It is now called **HERI**.

ARIAS MONTANUS, a learned Spanish divine, employed by Philip II. of Spain to publish another edition of the Bible, after that of cardinal Ximenes; which he finished with applause, and died at Avila in 1598.

ARICA, a sea port of South America, in the province of Los Charcas, in Peru. It was formerly a considerable place: but was almost entirely destroyed by an earthquake in 1605; so that now there are only about 150 families, most of

them blacks, mulattoes, and Indians. The houses are made with canes or reeds, set upright, and bound together with cords or thongs; and as it never rains here, they are covered only with mats, which makes the place look at a distance like an heap of ruins. The vale of Arica is about 2 league wide, and six leagues long, next the sea, and is all a barren country, except the spot where the old town stood, which is divided into little meadows of clover grass, and plots of sugar canes, with a few olive and cotton trees intermixt. This vale grows narrower as it runs eastward: and a league up there is a village, where they begin to cultivate pimento or Jamaica pepper, which is planted throughout all the rest of the vale; and there are several farms, which produce nothing else, that bring in the value of, 80,000 crowns yearly. The Spaniards of Peru are so used to this pepper, that they dress no provisions without it. Long. 70. 15. W. Lat. 18. 26. S.

ARICIA, a princess of the blood royal of Athens, the wife of Hippolytus, who was restored to life by Æsculapius; and is said to have erected a temple to Diana in the forest of Aricine, where he was concealed after his resurrection, and to have established a priest and festivals.

ARICINA, in the mythology, an epithet of Diana, under which she was worshipped in the forest of **ARICINE**. See last article.

ARICINE, a forest of Athens, so named from the princess **ARICIA**.

ARICONIUM, a town of the Silures, a nation of the ancient Britons, now called **HEREFORD**. Long. 2. 42. W. Lat. 52. 4. N.

(1.) * **ARID.** *adj.* [*aridus*, Lat. dry.] Dry; parched up.—My complexion is become a dust, and my body *arid*, by visiting lands. *Arbutnot and Pope*.—

His harden'd fingers deck'd the gaudy spring,
Without him Summer were an *arid* waste.

Thomson.

(2.) **ARID**, plowed. *Chaucer.*

ARIDAS, a kind of taffety, manufactured in the East Indies from a shining thread which is got from certain herbs. whence they are styled *aridas of herbs*.

To **ARIDATE**, *v. a.* to make dry. *Bailey.*

ARIDED, or } in astronomy, a fixed star of
ARIDEF, } the second magnitude, in the
extremity of the swan's tail. It is also called **NIEREZIM** and **ADIGEGE**.

ARIDELOSIS, [*αριδελωσις*,] in rhetoric, is sometimes used for the figure commonly called *synonymia*.

* **ARIDITY.** *n. f.* [from *arid*.] 1. Dryness; ficcidity.—Salt taken in great quantities will reduce an animal body to the great extremity of *aridity*, or dryness. *Arbutnot on Aliments*. 2. In the theological sense, a kind of insensibility in devotion, contrary to unctiō or tenderness.—Strike my soul with lively apprehensions of thy excellencies, to bear up my spirit under the greatest *aridities* and dejections, with the delightful prospect of thy glories. *Norris*.

ARIDULLAM, in natural history, a kind of zarnich found in the East Indies. See **ZARNICH**.

ARIDURA, in physic, a dryness or want of moisture. The word is also used by some for an **ARIDITY**, or consumption; by others for



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ring the space of 3000 years, alternately conquer, and are conquered; that for other 3000 years, they will wage mutual war, fight, and destroy the works of each other, till at last Hades (or the evil spirit) shall perish, and men become perfectly happy, their bodies needing no food, nor casting any shadow, i. e. being perfectly transparent.

ARIMASPI, a people of Sarmatia Europea, S. of the Montes Riphæi, said by Mela to have but one eye; a fable broached by Aristeas Proconnesus, according to Herodotus.

ARIMATHEA, a town of Judea, thought to be the same with *Ramatha*, (1 Sam. i.) and thus in the tribe of Ephraim.—This place is now called *Ramla*; and is in a very ruinous state, containing nothing but rubbish within its boundaries. The Aga of Gaza resides here in a Serai, the floors and walls of which are tumbling down. He maintains about 100 horsemen, and as many Barbary soldiers, who (says Mr Volney) are lodged in an old Christian church, the nave of which is used as a stable, and in an ancient kan, which is disputed with them by the scorpions. The adjacent country is planted with lofty olive trees, disposed in quincunxes. The greatest part of them are as large as the walnut trees of France; but they are lately perishing through age, the ravages of contending factions, and even from secret mischief; or, in these countries, when a peasant would revenge himself of his enemy, he comes by night, and saws or cuts his trees close to the ground, and the wound, which he takes care to cover, draining off the sap like an issue, the olive tree languishes and dies. Among these plantations, we meet, at every step, with dry wells, cisterns fallen in, and vast vaulted reservoirs, which prove that, in ancient times, this town must have been upwards of a league and a half in circumference. At present it scarcely contains 200 families. The little soil which is cultivated, by a few of them, belongs to the Mufti, and two or three persons report to him. The rest content themselves with raising cotton, which is chiefly purchased by the French houses established there. The only remarkable antiquity at Ramla is the minaret of a ruined mosque on the road to Yafa, which is very old; and by an Arabic inscription appears to have been built by the sultan Saladin.

ARIMINUM, a town of Umbria, or Romagna, at the mouth of the Ariminus, on the Gulph of Venice. The seizing on it by Cæsar gave rise to the civil war. It is now called *Rimini*. Long. 13. 38. E. Lat. 44. 10. N.

ARIMINUS, a river that runs into the Gulph of Venice.

ARINGA, in ichthyology, a name given by Paulus Jovius and others to the herring.

ARIOBARZANES, a king of Cappadocia, and an ally of the Romans. He joined Pompey's party, and was four times expelled from his kingdom, and as often restored.

ARIOCH, king of Ellasar, an ally of Chedor-lamer, was one of the nine monarchs who engaged in the first battle of which we have any authentic account. See Gen. xiv.

* ARIOLATION, or ILARIOLATION. *n. s.* [*ariolatus*, Lat. a soothsayer.] Soothsaying; vaticination.—The priests of elder time deluded their

apprehensions with *ariolation*, soothsaying; and such oblique idolatries. *Brown*.

ARIOLI, in antiquity, a kind of prophets, or religious conjurers, who, according to Origen and Isidore, by abominable prayers, and horrible sacrifices at the altars of idols, procured answers to their questions concerning future events. These are also called *barioli*, and their operation *bariolation*. Sometimes they were denominated *aruspices*, or *baruspices*. The arioli were distinguished by a slovenly dress, disorderly and matted beards, hair, &c.

(1.) ARION, in fabulous history, an excellent musician and poet, inventor of dithyrambics. Periander entertained him at his court, where getting an estate, and returning to Corinth, the sailors, for the sake of his money, threw him into the sea; when, according to the poets, a dolphin, charmed with his music, took him on her back and carried him safe ashore.

(2.) ARION, in the mythology, an admirable horse, much more famous in poetic history than Bucephalus in that of Alexander. Authors speak variously of his origin, though they agree in giving him a divine one. His production is most commonly ascribed to Neptune. This god, according to some, raised him out of the ground by a stroke of his trident: according to others, he begot him upon the fury Erynnyes; according to others, upon Ceres, whom he ravished in the form of a horse, she having previously assumed the form of a mare to elude his pursuit. This horse was nursed by the Nereids; and being sometimes yoked with the sea-horses of Neptune to the chariot of this god, he drew him with incredible swiftness through the sea. He had this singularity in him, that his right feet resembled those of a man. Neptune gave him to Capreus king of Haliartus. Capreus made a present of him to Hercules; who mounted him when he took the city of Elis, gained the prize with him in the race against Cygnus the son of Mars near Træcena, and at last made a present of him to Adrastus. It was under this last master that Arion signalized himself most: he won the prize for racing at the Nemean games, which the princes who went to besiege Thebes instituted in honour of Archemorus; and was the cause that Adrastus did not perish in this famous expedition, as all the other chiefs did.

ARIOSE. See next article.

* ARIOSIO. *n. s.* [Ital. in musick.] The movement of a common air, song, or tune. *Dict.*

ARIOSTO, Lodovico, the famous Italian poet, author of Orlando Furioso, was born at the castle of Reggio in Lombardy in 1474. His father, who was major-domo to Duke Hercules, lived to the extent of his fortune, and so left but little at his death. Ariosto, from his childhood, showed great marks of genius, especially in poetry; and wrote a tragedy in verse on the story of Pyramus and Thisbe, which his brothers and sisters played. His father being utterly unlearned, and rather regarding profit than his son's inclination, compelled him to study the civil law, in which having plodded some years to no purpose, he quitted it for more pleasing studies; yet often lamented, as Ovid and Petrarch did before him, and our own

Milton

Milton since, that his father banished him from the Muses. At the age of 24, Ariosto lost his father, and found himself perplexed with family affairs. However, in about six years he was, for his good parts, taken into the service of Don Hippolito, cardinal of Este. At this time he had written nothing but a few sonnets; but he now resolved to make a poem, and chose Bayardo's *Orlando Innamorato* for a ground work. However, he was prevented writing for a great many years, and was chosen as a fit person to go on an embassy to Pope Julio II. where he gave such satisfaction, that he was sent again, underwent many dangers and difficulties; and at his return was highly favoured. Then, at his leisure, he again applied himself to his poem: but, soon after, he incurred the cardinal's displeasure for refusing to accompany him into Hungary; by which he was so discouraged, that he deferred writing for 14 years, even till the cardinal's death. After that, he finished by degrees, in great perfection, that which he began with great expectation. Duke Astolfo offered him great promotions if he would serve him; but, preferring liberty to grandeur, he refused this and other great offers from princes and cardinals, particularly from Leo X. from all whom, however, he received great presents. The Duke of Ferrara delighted so much in his comedies, of which he wrote five, that he built a stage on purpose to have them acted in his court, and enabled our poet to build himself a house in Ferrara, with a pleasant garden, where he used to compose his poems; which were highly esteemed by all the princes in Italy, who sent him many presents; but he said, "he would not sell his liberty for the best cardinal's hat in Rome." It was a small, though convenient house: Being asked, why he had not built it in a more magnificent manner, since he had given such noble descriptions of sumptuous palaces, beautiful porticos, and pleasant fountains, in his *Orlando Furioso*? he replied, "That words were cheaper laid together than stones. In his diet he was so temperate, that he was fit to have lived in the world when men fed upon acorns. Whether he was ever married, is uncertain. He kept company with one Alexandria, to whom, it was reported, he was married privately, and a lady Genevera, whom he often mentions in the 24th book of his *Orlando*, as poets intermix with their fictions some real amours of their own. He was urged to go ambassador to pope Clement, but would by no means accept this embassy. He translated the *Menecmi* of Plautus: and all his own comedies were so much esteemed, that they were frequently acted by persons of the first quality. When his Lena was first represented, Ferdinand of Este, afterwards Marquis of Massa, spoke the prologue. He began one of his comedies in his father's lifetime, when the following incident shows the remarkable talent he had for poetry. His father one day rebuked him sharply, charging him with some great fault; but all the while he returned him no answer. Soon after, his brother began the same subject; but he easily refuted him, and, with strong arguments, justified his own behaviour. "Why then (said his brother) did you not satisfy my father?" "In (said Lodovico) I was thinking of a part in

my comedy; and methought my father's speech to me was so suited to the part of an old man chiding his son, that I forgot I was concerned in it myself, and considered it only to make it a part of my play." Ariosto was tall, of a melancholy complexion, and so absorbed in study and meditation, that he often forgot himself. His picture was drawn by Titian in a masterly manner. He was honoured with the laurel by the hands of the emperor Charles V. He was naturally affable, always assuming less than his due, yet never putting up with a known injury even from his superiors. He was so fearful on the water, that, whenever he went out of a ship, he would see others go before him; and, on land, he would alight from his horse on the least apprehension of danger. He was of an amorous disposition, and left two natural sons. He enjoyed the friendship of the most eminent men of learning of his time, most of whom he mentions with great respect in the *hincanto* of his *Orlando Furioso*. His constitution was but weakly, so that he was obliged to have recourse to physicians the greatest part of his life. He bore his last sickness with great resolution and serenity; and died at Ferrara the 8th of July 1533, according to Sir John Harrington, being then 49 years of age. He was interred in the church of the Benedictine monks, who, contrary to the custom, attended his funeral. He had a bust erected to him, and an epitaph, written by himself, inscribed upon his tomb.

ARIPO, a strong town of Asia, on the western coast of the island of Ceylon, at the mouth of the Sarunda. It belongs to the Dutch; and to the east of it is a pearl fishery. Long. 80. 25. E. Lat. 8. 42. N.

ARISARIUM, or ARUM, in botany, wake-robin.

ARISBA, in ancient geography, 1. a town in the island of Lesbos: 2. Another in Troas, in the territory and to the S. E. of Abydos; the rendezvous of Alexander's army after their passage of the Hellespont: 3. a colony of the Mitylenians, taken and plundered by Achilles. It was the residence of Axylus, celebrated by Homer for his hospitality.

* To ARISE. *v. n. pret. arose, particip. arisen* [from *a* and *rise*.] 1. To mount upward as the sun.

He rose, and, looking up, beheld the skies.
With purple blushing, and the day arise. *Druid*
2. To get up as from sleep, or from rest.—So *Edras* arose up; and said unto them, ye have transgressed the law. 1. *Ejd.* ix. 7.—How long wilt thou sleep, O sluggard; when wilt thou arise out of thy sleep? *Prov.* vi. 9. 3. To come into view, as from obscurity.—There shall arise false Christs, and false prophets. *Matt.* xxiv. 4. To revive from death.—Thy dead men shall live, together with my body shall they arise: awake and sing, ye that dwell in dust. *Isaiab.* xxvi. 19. 5. To proceed or have its original.—They which were scattered abroad upon the persecution that arose about Stephen, travelled as far as Phoenice. *Acts.* xi. 19.—I know not what mischief may arise hereafter from the example of such an innovation. *Dryden.* 6. To enter upon a new station, to succeed to power or office.—

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ciples of Socrates who took money for teaching ; which being observed by the philosopher, he asked Aristippus, How he came to have so much ? Who in reply asked him, How he came to have so little ? Upon his leaving Socrates, he went to Ægina, as Athenæus informs us, where he lived with more freedom and luxury than before. Socrates sent frequent exhortations to him, in order to reclaim him ; but all in vain : and with the same view he published that discourse which we find in Xenophon. Here Aristippus became acquainted with Lais, the famous courtesan of Corinth ; for whose sake he took a voyage to that city. He continued at Ægina till the death of Socrates, as appears from Plato's *Phædon*, and the epistle which he wrote upon that occasion. He returned at last to Cyrene, where he professed philosophy, and instituted a sect which was called the *Cyrenaic*, from the place, and the *Hedonic* or the voluptuous, from its doctrines. During the height of the grandeur of Dionysius the Sicilian tyrant, a great many philosophers resorted to him ; and among the rest Aristippus, who was tempted by the magnificence of that court. Dionysius asking him the reason of his coming, he replied, " That when he wanted *wisdom*, he went to Socrates ; but now as he wanted *money*, he was come to him." He soon insinuated himself into the favour of Dionysius ; for, being a man of an easy temper, he conformed himself to every place, time, and person, and was a complete master of the most refined complaisance.

(2.) ARISTIPPUS, APOPHTHEGMS OF. Diogenes Laertius mentions several anecdotes of Aristippus, during his residence at the court of Sicily. Dionysius, at a feast, commanded that all should put on women's purple habits, and dance in them. Plato refused, alledging it would disgrace his manhood ; but Aristippus readily submitted and replied, " At feasts where mirth is free, a sober mind can never be corrupted." At another time, interceding with Dionysius in behalf of a friend but not prevailing, he cast himself at his feet : being reproved by one for that excess of humility, he replied, " That it was not *he* who was the cause of that submission ; but Dionysius, whose ears were in his *feet*." Dionysius showed him 3 beautiful courtezans, and ordered him to take his choice. Upon which he took them all 3 away with him, alledging that Paris was punished for preferring one to the other two : but when he had brought them to his door, he dismissed them, to show that he could either enjoy or reject with the same indifference. Having desired money of Dionysius, the latter observed to him, that he had assured him a wise man wanted nothing. " Give me, says he, what I ask, and we will talk of that afterwards." When Dionysius had given it him, " Now (says he), you see I do not want." By this complaisance he gained so much upon Dionysius, that he had a greater regard for him than for all the rest of the philosophers, though he sometimes spoke with such freedom to that king, that he incurred his displeasure. When Dionysius asked, Why philosophers haunted the gates of rich men, but not rich men those of philosophers ? he replied, " Because the latter know *what* they want, and the others do *not*." Another time,

Dionysius repeating out of Sophocles, these verses,
He that with tyrants seeks for bare support,
Enslaves himself, though free he came to court;
he immediately answered, " He is no slave, if he be *free to come*." Aristippus had a contest with Antisthenes the Cynic philosopher ; notwithstanding which, he employed his interest at court for some friends of Antisthenes, to preserve them from death, as we find by a letter of his to that philosopher. Diogenes followed the example of his master Antisthenes in ridiculing Aristippus, and called him the *court spaniel*. Suidas observes, that Aristippus surpassed all the philosophers in the acuteness of his apophthegms. Being once raised up, he left the room ; and the person who abused him, following him, and asking him why he went away, he answered, " Because it is in your power to raise me, but it is not in my power not to hear you." When one recommended his son to him, he demanded 500 drachmas ; and upon the father's replying, that he could buy a slave for that sum, " Do so (said he), and then you'll be master of a couple." Being reproached, because, having a suit of law depending, he feed a lawyer to plead for him, " Just so (said he), when I have a great supper to make, I always hire a cook." Being asked what was the difference between a wise man and a fool, he replied, " Send both of them together naked to those who are acquainted with neither of them, and then you'll know." Being reproved by Plato for his costly feasts, " I warrant you (said he) that you would not have bestowed three sabbaths upon such a dinner ;" which the other confessed. " Why, then," said he " I find that I love *liberty*, and you love your money." His servants carrying after him a great weight of money, and being ready to sink upon the road under his burden, he bid him throw away all that was too much for him to carry. Horace mentions this fact, *Lib. 2. Sect. 3*. Being reproached for going from Socrates to Dionysius, he replied, " That he went to Socrates for instruction, and to Dionysius for *diversion*." Having received money of Dionysius at the same time that Plato accepted a book of him, and being reproached for it, " The reason is plain (said he), I want money, and Plato wants books." Having lost a considerable farm, he said to one who seemed to compassionate his loss, " You have but one field ; I have 3 left : why should not I rather grieve for you ?" When a person told him " That the land for *his* sake was lost," he replied " That it was better so, than that *he* should be lost for the sake of the land."

(3.) ARISTIPPUS, OPINIONS OF. After he had lived a long time with Dionysius, his daughter Arete sent to him, to desire his presence at Cyrene to take care of her affairs, since she was in danger of being oppressed by the magistrates. But he fell sick in his return home, and died at Lipara, an Æolian island. With regard to his principal opinions ; like Socrates, he rejected the sciences that they were then taught, and pretended that logic alone was sufficient to teach truth and fix its bounds. He asserted, that pleasure and pain were the criterions by which we were to be determined, that these alone made up all our passions ; that the first produced all the soft emotions, and the latter all the violent ones. The assemblage of all pleasures,

"A. M. 3843. He reigned
 pontifical dignities, A. M. 3843. He reigned
 more than a year.
 ANISTOBOLUS, II. the Son of Alexander Jan-
 nina, king of the Jews, succeeded his brother Her-
 odes, A. M. 3843, and reigned 5 years, when
 he was dethroned and Herod the Great restored, A. M.
 3848.

clusters towards the upper part of the stalks, which
 are of a dark purple colour.
 3. *ARISTOLACHIA LONGA* is a native of France,
 Spain, and Italy. It has long tap-roots like car-
 rots; the branches are weak and trailing, extend-
 ing little more than a foot; the flowers come out
 from the wings of the leaves like the other, are of
 a pale
 F p p 2



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tells us, she was so much charmed with this performance, that after she had translated it, and read it over 200 times, it did not become in the least tedious to her, which she could not say of any other piece; and that the pleasure which she received from it was so exquisite; that she forgot all the indignation which Aristophanes deserved for employing his wit to ruin a man, who was wisdom itself, and the greatest ornament of Athens. Aristophanes having some aversion to the poet Euripides, satirized him in several of his plays, particularly in his *Frogs* and his *Theſmophoriazuse*. He wrote his *Peace* in the 10th year of the Peloponnesian war, when a treaty for 20 years was concluded between the Athenians and the Lacedæmonians, though it continued but 7 years. The *Acarnenses* was written after the death of Pericles, and the loss of the battle in Sicily, in order to dissuade the people from intrusting the safety of the commonwealth to such imprudent generals as Lamachus. Soon after, he represented his *Aves* or *Birds*; by which he admonished the Athenians to fortify Decelæa, which he calls by a fictitious name, *Nepheleococcygia*. The *Wasps*, or *Waſps*, was written after another loss of Sicily, which the Athenians suffered from the misconduct of Chares. He wrote the *Lysistrata*, when all Greece was involved in a war; in which comedy the women are introduced debating upon the affairs of the commonwealth; when they come to a resolution, not to go to bed with their husbands, till a peace should be concluded. His *Plutus*, and other comedies of that kind, were written after the magistrates had given orders that no person should be exposed by name upon the stage. He invented a peculiar kind of verse, which was called by his name, and is mentioned by Cicero in his *Brutus*; and Suidas says, he was the inventor of the tetrameter and octameter verse. Aristophanes was greatly admired among the ancients, especially for the true Attic elegance of his style. The time of his death is unknown; but he was living after the expulsion of the tyrants by Thrasybulus, whom he mentions in his *Plutus* and other comedies. There have been several editions and translations of his works. Nicolaus Frischin, a German, famous for his biblical knowledge, in the 16th century, translated *Plutus*, the *Clouds*, the *Frogs*, the *Equites*, and the *Acarnenses*, into Latin verse. Quintus Irenæus Florens rendered into Latin verse the *Wasps*, the *Peace*, and *Lysistrata*; but his translation is full of obsolete words and phrases. M. Lacæmus Dacier published at Paris, in 1692, a French version of *Plutus* and the *Clouds*, with critical notes, and an examination of them according to the rules of the theatre. Mr Lewis Theobald likewise translated these two comedies into English, and published them with remarks. The best edition of this author is that published by Ludolphus Kuster, at Amsterdam, in folio, in 1710, and dedicated to the Earl of Halifax.

ARISTOPHANEUM, in ancient pharmacy, a kind of emollient plaster, made of pitch, wax, opopanax, apochyma, and vinegar.

ARISTOTELIA, in antiquity, annual feasts celebrated by the citizens of Stagiris, in honour of Aristotle, who was born there; and in gratitude for his having procured from Alexander the

rebuilding and repeopling of that city, which had been demolished by king Philip.

ARISTOTELIAN, something that relates to the philosopher Aristotle.

ARISTOTELIAN PHILOSOPHY, the philosophy taught by Aristotle, and maintained by his followers. It is also called the Peripatetic philosophy. See **PERIPATETICS**, and **ARISTOTLE**, § 3.

ARISTOTELIANS, a sect of philosophers, called also *Peripatetics*. The Aristotelians and their dogmata prevailed long in the schools and universities; even in spite of all the efforts of the Cartesians, Newtonians, and other corpuscularians. But the systems of the latter have at length gained the pre-eminence; and the Newtonian philosophy in particular, is now generally received. The principles of Aristotle's philosophy, the learned agree, are chiefly laid down in his four books *De Cælo*; his eight books of *Physical Auscultation*, *Quæstiones ænigmatum*, belonging rather to logics, or metaphysics, than to physics. Instead of the more ancient systems, he introduced matter, and form, and privation, as the principles of all things; but he does not seem to have derived much benefit from them in natural philosophy. His doctrines are, for the most part, so obscurely expressed, that it has not yet been satisfactorily ascertained, what were his sentiments on some of the most important subjects. He attempted to refute the Pythagorean doctrine concerning the twofold motion of the earth; and pretended to demonstrate, that the matter of the heavens is ungenerated, incorruptible, and subject to no alteration: and he supposed that the stars were carried round the earth in solid orbs. The reader will find a distinct account of the logical part of his philosophy, by Dr Reid, professor of moral philosophy, in the university of Glasgow, in Lord Kames's *Sketches of the History of Man*, vol. II. and Mr Harris has published a sensible commentary on his *Categories*, under the title of *Philosophical Arrangements*.

ARISTOTELICA ROTA. See **ROTA**.

(1.) **ARISTOTLE**, the chief of the Peripatetic philosophers, born at Stagira, a small city in Macedon, in the 99th Olympiad, about 384 years before the birth of Christ. He was the son of Nicomachus, physician to Amyntas, the grandfather of Alexander the Great. He lost his parents in his infancy; and Proxenes, a friend of his father's, who had the care of his education, taking but little notice of him, he quitted his studies, and gave himself up to the follies of youth. After he had spent most of his patrimony, he entered into the army: but not succeeding in this profession, he went to Delphos, to consult the oracle what course he should follow; when he was advised to go to Athens, and study philosophy. He accordingly went thither about 18 years of age, and studied under Plato till he was 37. By this time he had spent his whole fortune; and we are told, that he got his living by selling powders, and so he receipts in pharmacy. He followed his studies with most extraordinary diligence, so that he soon surpassed all in Plato's school. He eat little, and slept less; and, that he might not oversleep himself, Diogenes Laertius tells us, that he lay always with one hand out of the bed, having a ball of brass

[Faint handwritten notes and markings]

[illegible]

to Theophrastus, traduced him ever after. But Aristotle the Peripatetic, in Eusebius, exculpates Aristoxenus, and assures us that he always spoke with great respect of Aristotle. Aristoxenus lived under Alexander the Great and his first successors. His *Harmonics* in 3 books, (all that have reached us,) together with Ptolemy's *Harmonics*, were first published by Gogavinus, at Venice, in 1562, 4to, with a Latin version. John Meursius next translated these 3 books into Latin, from the MS. of Jos. Scaliger. With these he printed at Leyden, in 1616, 4to, Nicomachus and Alypius, two other Greek writers on music. Meibomius collected these musical writers together; to which he added Euclid, Bacchius senior, and Aristides Quintilianus; and published the whole, with a Latin version and notes, from the elegant press of

Elzevir, Amst. 1652, and dedicated them to Christina queen of Sweden. Aristoxenus is said by Suidas to have written 452 different works, among which those on music were the most esteemed; yet his writings on other subjects are frequently quoted by ancient authors, notwithstanding Cicero and others say, he was a bad philosopher, and had nothing in his head but music. The titles of several of the lost works of Aristoxenus, quoted by Athenæus and others, have been collected by Meursius in his notes upon this author, by Tonsius and Menage, all which Fabricius had digested into alphabetical order.

* ARITHMANCY. *n. f.* [from *αριθμος*, number, and *μανθάνω*, divination.] A foretelling future events by numbers. *Dict.*

A R I T H M E T I C.

INTRODUCTION.

SECT. I. ETYMOLOGY, and DEFINITION of ARITHMETIC.

(1.) **A R I T H M E T I C**, [from *αριθμος*, number, and *μετρον*, to measure,] is a science which explains the properties of numbers, and shows the method or art of computing by them. The late Dr Robertson justly styles it, the most perfect of the sciences.

SECT. II. HISTORY of ARITHMETIC.

(1.) At what period Arithmetic was first introduced into the world, we can by no means determine. That some part of it, however, was coeval with the human race is absolutely certain. We cannot conceive how any man endowed with reason can be without some knowledge of numbers. We are indeed told of nations in America who have no word in their language to express a greater number than three, which they call *patarrarouicourac*: but that such nations should have no idea of a greater number than this, is absolutely incredible. Perhaps they may compute by threes, as we compute by tens; and this may have occasioned the notion that they have no greater number than three.

(2.) But though we cannot suppose any nation, or indeed any single person, ever to have been without some knowledge of the difference between greater and smaller numbers, it is possible that mankind may have subsisted for a considerable time without bringing this science to any perfection, or computing by any regular scale, as 10, 100, &c. That this, however, was very early introduced into the world, even before the flood, we may gather from the following expression in Enoch's prophecy, as mentioned by the apostle Jude: "Behold, the Lord cometh with *ten thousands* of his saints." This shows, that even at that time men had ideas of numbers as high as we have at this day, and computed them also in the same manner, namely by tens.

(3.) The directions also given to Noah, con-

cerning the dimensions of the ark, leave us no room to doubt that he had a knowledge of both numbers, and measures. When Rebekah was sent away to Isaac, Abraham's son, her relations wished she might be the mother of *thousands of millions*; and if they were totally unacquainted with the rule of multiplication, it is difficult to see how such a wish could have been formed. It is probable, therefore, that the four fundamental rules of arithmetic have always been known to some nation or other.

(4.) Some nations, however, like the Europeans formerly, and the Africans and Americans now, have doubtless been immersed in the most abject and deplorable state of ignorance; and might therefore remain for some time unacquainted with numbers, except such as they had immediate occasion for. And, when they came afterwards to improve, either from their own industry, or hints given by others, they might fancy that they themselves, or those from whom they got the hints, had invented what was known long before.

(5.) Dr Chambers thinks it highly probable, that arithmetic, as a science, must have taken its rise from the introduction of commerce; and consequently that it should be of Tyrian invention.

(6.) From Asia it passed into Egypt, says Josephus, by means of ABRAHAM. Here it was greatly cultivated and improved; insomuch that a large part of the Egyptian philosophy and theology seems to have turned altogether upon numbers. Hence those wonders related by them about unity, trinity, the numbers seven, ten, four, &c. In fact, Kircher, (in his *Oedip. Egypt. tom. 2. p. ii.*) shews, that the Egyptians explained every thing by numbers. Pythagoras affirms, that the nature of numbers goes through the whole universe; and that the knowledge of numbers is the knowledge of the Deity.

(7.) From Egypt arithmetic was transmitted to the Greeks, who were doubtless the first European nation among whom arithmetic arrived at any degree of perfection. M. Gouget is of opinion, they used pebbles in their calculations: a

proof

... was devoted, as is supposed, by CLAUDIUS PTOLEMAEUS, about A. D. 100. The design of it was to remedy the difficulties of the common method, especially with regard to fractions. In this kind of arithmetic, every unit was supposed to be divided into 60 parts, and each of these into 60 others, and so on; hence any number of 3600 parts were called *sexagesimal fractions*; more or less, he made the proportion in these also sexagesimal. Those from one to 59 were marked

books of EUCLID's elements, where he treats proportion and of prime and composite numbers both of which have received improvement in his time, especially the former.

(19.) The next of whom we know any thing is NICOMACHUS the Pythagorean, who wrote a treatise of the theory of arithmetic, containing the distinction and division of numbers into classes, as plain, solid, triangular, quadrangular, and the rest of the figurate numbers; these are called, numbers odd and even, &c. with some of the more general properties of the several kinds.



a cypher is written on the right of it thus, 20, it represents 2 tens, or twenty; and if another cypher be affixed thus, 200, it will represent 2 hundreds, &c.

(32.) It has been said, that "there does not seem to be any number naturally adapted for constituting a class of the lowest, or any higher rank to the exclusion of others; that however, as ten has been universally used for this purpose by most nations who have cultivated this science, it is probably the most convenient for general use. Other scales (it is alledged,) may be assumed: thus, if eight were the scale, 6 times 3 would be two classes and two units, and the number 18 would then be represented by 22. If 12 were the scale, 5 times 9 would be three classes and nine units, and 45 would be represented by 39, &c."

(33.) But this theory seems far from being supported by fact. The universality of the practice of reckoning by tens is allowed even by those who plead for it. The antiquity of it, which as above observed, (§ 3,) is antediluvian, might also be urged, as an evidence that it is the most natural classification of numbers. But this is not all. There seems to be a regularity of gradation from the lowest to the highest possible numbers, and a uniformity of proportion in reckoning them, upon the decadary plan, that is unattainable, if not impracticable by adopting any other mode, or any higher or lower number as the limit of a class. An additional argument may be drawn from considering how we first acquire our ideas of numbers.

(34.) The first elements of arithmetic are acquired during our infancy: for, when a child gathers as many stones together as suits his fancy, and then throws them away, he, acquires the first elements of the two capital operations in arithmetic, addition and subtraction. Small numbers are most easily apprehended: a child soon knows what *two* and what *three* is; but has not any distinct notion of *twenty-three*. Experience removes his difficulty by degrees, and he becomes accustomed to handle larger collections, and to form many units into a class, and several of these classes into one of a higher kind, and thus to advance through as many ranks of classes as occasion requires. If a boy arrange an hundred stones in one row, he would with difficulty reckon them; but if he place them in ten rows of ten stones each, he will reckon an hundred with ease; and if he collect ten such parcels, he will reckon a thousand.

(35.) But suppose a teacher should adopt the mechanical method of teaching a boy arithmetic, and should at the same time take it into his head to reckon by *sevens* or *nines* instead of *tens*, we may readily believe, he would find it a very difficult task to make his pupil entertain any accurate idea of the proportions between the larger and smaller numbers, whatever denomination such fanciful arithmetician might give them. The ancient Greeks and Romans would have brought the science of arithmetic to a much greater degree of perfection, than they ever did, had they hit upon the method of expressing by TEN DISTINCT CHARACTERS the numbers by which they reckoned. But the idea of a CYPHER, which can only be introduced into the *decadary* system, and which may be stiled the KEY-STONE of ARITHMETIC, seems never to have struck them; and thus, though they reckoned properly enough by tens, yet not having characters proportionate to express the numbers, they involved their arithmetic in a labyrinth of confusion, from which neither a EUCLID nor an ARCHIMEDES, with all their wooden mechanical powers, were able to extricate it. In a word, it is to the cypher in uniform alternation with the nine digits, that the moderns owe the honour of having PERFECTED A SCIENCE, in which the ancients, with their great attainments, had made but small progress. And perhaps, if all our modern weights and measures, were divided and subdivided upon the decadary plan, instead of into *fourths*, *eighths*, *twelfths*, *sixteenths*, &c. that general uniformity both, so long wanted, might be soon attained.

(36.) NUMERATION implies the numbering, or reading of numerical characters; or the reckoning any number of things by them. For the more expeditious numbering, and expeditious reading of large numbers, when they are expressed by figures, they are divided from the right hand towards the left into periods and half periods, each half period consisting of three figures; the common name of the first period being units, or ones; of the second, millions, of the third billions; of the fourth trillions, &c. Also the first half of any period is so many ones of it, but the latter half is so many thousands of it. The following example exhibits a summary of this whole doctrine, and may be extended to sextillions, septillions, octillions, &c. *ad infinitum*.

| <i>Quintillions.</i> | | | | | <i>Quadrillions.</i> | | | | | <i>Trillions.</i> | | | | | <i>Billions.</i> | | | | | <i>Millions.</i> | | | | | <i>Units.</i> | | | | | | | | | | |
|----------------------|---|---|---|---|----------------------|---|---|---|---|--------------------|---|---|---|---|--------------------|---|---|---|---|--------------------|---|---|---|---|--------------------|---|---|---|---|---|---|---|---|---|---|
| 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| Hundred thousands, | | | | | Hundred thousands, | | | | | Hundred thousands, | | | | | Hundred thousands, | | | | | Hundred thousands, | | | | | Hundred thousands, | | | | | | | | | | |
| Ten thousands, | | | | | Ten thousands, | | | | | Ten thousands, | | | | | Ten thousands, | | | | | Ten thousands, | | | | | Ten thousands, | | | | | | | | | | |
| Thousands, | | | | | Thousands, | | | | | Thousands, | | | | | Thousands, | | | | | Thousands, | | | | | Thousands, | | | | | | | | | | |
| Hundreds, | | | | | Hundreds, | | | | | Hundreds, | | | | | Hundreds, | | | | | Hundreds, | | | | | Hundreds, | | | | | | | | | | |
| Tens, | | | | | Tens, | | | | | Tens, | | | | | Tens, | | | | | Tens, | | | | | Tens, | | | | | | | | | | |
| Units. | | | | | Units. | | | | | Units. | | | | | Units. | | | | | Units. | | | | | Units. | | | | | | | | | | |

A number expressing a quantity of one name or denomination, is called a *simple number*, as 20 pounds, or 17 gallons, or 5 days; and that representing a quantity of several names, is called a

compound number, as 13 pounds 3 shillings and 6 pence, or 17 gallons and 2 pints, or 3 hours and 50 minutes.

(37.) RULE.—To READ or EXPRESS in WORDS, by NUMBER expressed in FIGURES.

Divide the figures in the given number, as in the general example above, into periods and half periods, by any convenient marks; then beginning at the left, the figures are thus read, viz. the first figure of each half period is named by itself with the word *hundreds*, but the other two are named together; and at the end of the first half of each period, the word *thousands* is named; and at the end of the other half, the common name of the whole period, except it be the units period, whose name is not expressed.

SECT. II. SIMPLE ADDITION.

(38.) Simple Addition is the finding of one simple number equal to several simple numbers taken together. The number which is equal to several taken together is called their sum.

(39.) SIMPLE ADDITION may be performed by the RULE.

1. Place the several numbers, to be added, underneath each other, so that the figures of the same name, with respect to units, tens, &c. may stand directly under each other.

2. Draw a line under the lowest number; then add up the column of units, and consider how many tens are in the sum, for which you must write so many ones to the next column, writing down only the excess over and above the tens, below the line straight under its proper column.

3. Add all the columns in the same manner, and the figures below the line will express the sum required.

(40.) PROOF. Cut off the uppermost number, drawing a line below it. Add all the rest of the lines of numbers together, and set their sum below the sum to be proved. Then add this last sum and the uppermost line together, and their sum will be the same as that found by the first addition, when the work is all right.

EXAMPLES.

| | |
|-------|-------|
| 2591 | 39481 |
| 45927 | 22 |
| 621 | 6185 |
| 13248 | 17293 |
| 7931 | 26817 |
| <hr/> | <hr/> |
| 70318 | 89798 |

SECT. III. SIMPLE SUBTRACTION.

(41.) Simple subtraction is the finding how much one simple number exceeds another, or the taking a less simple number out of a greater. The number to be subtracted is called the **SUBTRAHEND**; and that out of which it is to be taken, is called the **MINUEND**; also the number remaining after the one is taken out of the other, is named their *difference*.

(42.) SIMPLE SUBTRACTION is performed by the following RULE.

1. Place the subtrahend under the minuend according to the directions given in addition, and draw a line below them.

2. Begin at the right, and subtract each under figure from that which stands above it, writing

the remainder straight under them below the line; so shall all the remainders together express the difference required.

3. But when any under figure exceeds that which is above it, conceive 10 to be added to the upper, and subtract the under from the sum; but in this case, you must add 1 to the next under figure, before you subtract it.

(43.) PROOF. Add the difference and subtrahend together, and the sum will be equal to the minuend when the operation is right.

| | |
|-------------------|--------|
| EXAMPLE. Minuend, | 159327 |
| Subtrahend, | 61489 |
| | <hr/> |
| | 97838 |

PROOF, 159327

SECT. IV. SIMPLE MULTIPLICATION.

(44.) Simple multiplication is the finding of a simple number, which shall contain any given simple number a certain proposed number of times; and it is therefore a compendious method of addition.

(45.) The two proposed numbers are in general, termed the **FACTORS** of the multiplication; but in particular, that which is to be multiplied, is called the **MULTIPlicAND**; and that by which it is multiplied, the **MULTIPLIER**; the number found from the operation is named the **PRODUCT** of the two factors.

(46.) Before proceeding to any operations in this rule, the following table of products must be got by heart very perfectly:

MULTIPLICATION TABLE.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|----|----|----|----|----|----|----|----|
| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 |
| 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 |
| 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |
| 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 |
| 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 |
| 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 |
| 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 |

(47.) SIMPLE MULTIPLICATION may be performed by the two following RULES.

I. To MULTIPLY by ANY NUMBER in the FIRST LINE of the foregoing TABLE of PRODUCTS.—Begin at the right of the multiplicand, and multiply each figure in it by the multiplier, writing down the whole of such products as are less than ten; but for such as are just equal to a certain number of tens, write down 0, and carry 1 for each 10 to the next product; and for such as exceed a number of tens, write down the excess, and carry for the tens as before.

1000

1000

1000

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1000

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1000

1000

1000

1000

remainder, the same as if the division had been performed at once. After this operation is begun, it must be continued according to the description, though some of the preceding divisions should happen to have no remainders. So to divide 42901685 by 96 whose component parts are 8 and 12; divide the first by 8, and this quotient by the 12, and the remainders are 5 and 6; then 6 times 8 are 48. to which add the 5, and the sum 53 is the whole remainder to the whole divisor 96.

8)42901685
12) 53627105
Quotient 44618255

IV. One who is pretty ready in division, may, even in the largest divisions, subtract each figure of the product as he produces it, and write down only the remainders.

EXAMPLE 833) 3104679 (3727 88
6056
2257
5919
88

SECT. VI. REDUCTION.

(55.) Reduction is the conversion of numbers from one name to another, but still retaining the same value. If the reduction be to a less name, it is commonly called reduction DESCENDING; but if to a greater, reduction ASCENDING.

(56.) RULE. Consider how many of the less name concerned make 1 of the greater, and by that number multiply the given number if the reduction be descending, but divide if ascending, and the product or quotient will be the value in the other name. When there are names between the proposed and required ones, it is best to reduce the proposed to the next less or greater name, and then to the next less or greater again, and so on, till you have reduced it to the name required.—When, in reduction descending, the proposed is a compound number, you must add, or take in the small numbers in the name below the greatest, to the same names, as you proceed in the reduction. When, in reduction ascending, you have any remainders after dividing, they will have the same names as their respective dividends, and may be placed after the last quotient, according to the order of their names, the greatest first; so shall the compound number thus formed be the answer.

(57.) OF MONEY.

| Farthings. | Pence. | Shillings. | Pound. |
|------------|--------|------------|--------|
| 4 | 1 | | |
| 48 | 12 | 1 | |
| 960 | 240 | 20 | 1 |

This and the following tables are to be understood thus: The words at the top are the names of all the numbers straight below them; and all the numbers upon the same line, from right to left, are of equal value: thus in the last line of this table, 960 farthings, 240 pence, 20 shillings, and 1 pound are all equal to each other.

(58.) The full weight and value of our gold and silver coin is as below:

| GOLD. | VALUE. | WEIGHT. |
|----------------|--------|----------|
| | l s d | dwt. gr. |
| A guinea | 1 1 0 | 5 9½ |
| Half-guinea | 0 10 6 | 2 16½ |
| Quarter guinea | 0 5 3 | 1 8½ |

| SILVER. | Value. | Weight. |
|------------|--------|----------|
| | s d | dwt. gr. |
| A crown | 5 0 | 19 8½ |
| Half-crown | 2 6 | 9 16½ |
| Shilling | 1 0 | 3 21 |
| Sixpence | 0 6 | 1 22½ |

The value of gold is nearly 4l. an ounce, or 2d a grain; and silver is nearly 18s an ounce. Also any quantity of gold is to the same weight of standard silver, in the proportion of 15 and 1-14th to 1, or nearly 15 to 1.

(59.) OF TROY WEIGHT.

| Grains. | Pennyweights. | Ounces. | Pound. |
|---------|---------------|---------|--------|
| 24 | 1 | | |
| 480 | 20 | 1 | |
| 5760 | 240 | 12 | 1 |

By this weight are weighed jewels, gold, silver, corn, bread, and liquors. One grain of Troy weight is equal to one grain and a half of sound dry wheat.

(60.) OF APOTHECARIES WEIGHT.

| Grains. | Scruples. | Drams. | Ounces. | Pound. |
|---------|-----------|--------|---------|--------|
| 20 | 1 | | | |
| 60 | 3 | 1 | | |
| 480 | 24 | 8 | 1 | |
| 5760 | 288 | 96 | 12 | 1 |

This weight is so called, because the apothecaries use it in compounding their medicines; but they buy and sell their drugs by avoirdupoise weight. Apothecaries is the same as troy weight, having only some different divisions.

(61.) OF AVOIRDUPOISE WEIGHT.

| Drams. | Ounces. | Pounds. | Quarters. | Hundreds. | Tons. |
|--------|---------|---------|-----------|-----------|-------|
| 16 | 1 | | | | |
| 256 | 16 | 1 | | | |
| 7168 | 448 | 28 | 1 | | |
| 28672 | 1792 | 112 | 4 | 1 | |
| 573440 | 35840 | 2240 | 80 | 20 | 1 |

By this weight are weighed all things of a coarse or drossy nature; such as grocery and chandlery wares, and all metals except gold and silver.

| | oz. | dwt. | gr. |
|--------------------------|-----|------|-----------|
| 1 lb. Avoirdupoise makes | 14 | 11 | 15½ Troy, |
| 1 oz. | - | - | 1 0 18 5½ |
| 1 dr. | - | - | 0 1 3½ |

(62.) OF LONG MEASURE.

| Inches. | Feet. | Yards. | Poles. | Furlongs. | Mile. |
|---------|-------|--------|--------|-----------|-------|
| 12 | 1 | | | | |
| 36 | 3 | 1 | | | |
| 198 | 16½ | 5½ | 1 | | |
| 7920 | 660 | 220 | 40 | 1 | |
| 63360 | 5280 | 1760 | 320 | 8 | 1 |

An inch is supposed equal to 3 barley corns in length.

- 4 inch.—a hand.
- 6 feet, or 2 yards—a fathom.
- 3 miles—a league.
- 60 nautical or geographical miles—a degree.

or $69\frac{1}{2}$ statute miles nearly.
360 degrees, or 25000 miles nearly,
are the circumference of the earth.

(63.) OF CLOTH MEASURE.

| Inches. | Nails. | Quarters. | Yard. |
|------------------------------------|--------|-----------|-------|
| $2\frac{1}{4}$ | 1 | | |
| 9 | 4 | 1 | |
| 36 | 16 | 4 | 1 |
| 3 qrs. = 1 ell Flemish. | | | |
| 5 — — English. | | | |
| 6 — — French. | | | |
| 4 qrs. $1\frac{1}{2}$ inch Scotch. | | | |

(64.) OF SQUARE OR LAND MEASURE.

| Sqr. inch. | Sqr. feet. | Sqr. yds. | Sqr. poles. | Roods. | Acre. |
|------------|------------------|-----------------|-------------|--------|-------|
| 144 | 1 | | | | |
| 1296 | 9 | 1 | | | |
| 39204 | $272\frac{1}{4}$ | $30\frac{1}{4}$ | 1 | | |
| 1568160 | 17890 | 1210 | 40 | 1 | |
| 6272640 | 43560 | 484 | 60 | 4 | 1 |

OF SCOTS LAND MEASURE.

| Square ells. | Falls. | Roods. | Acre. |
|--------------|--------|--------|-------|
| 36 | 1 | | |
| 1440 | 40 | 1 | |
| 5760 | 160 | 4 | 1 |

(65.) OF WINE MEASURE.

| Pints. | Gallons. | Tres. | Hhds. | Punchcons. | Pipes or Butts. | Ton. |
|--------|----------|----------------|----------------|----------------|-----------------|------|
| 8 | 1 | | | | | |
| 336 | 42 | 1 | | | | |
| 504 | 63 | $1\frac{1}{2}$ | $\frac{1}{2}$ | | | |
| 672 | 84 | 2 | $1\frac{1}{2}$ | 1 | | |
| 1008 | 126 | 3 | 2 | $1\frac{1}{2}$ | 1 | |
| 2016 | 252 | 6 | 4 | 3 | 2 | 1 |

231 cubic inch.—a gallon.

10 gall.—an anker.

18 gall.—a rundlet.

$31\frac{1}{2}$ gall.—a barrel.

By this measure, wines, brandies, spirits, perry, cyder, mead, vinegar, oil, and honey are measured.

(66.) OF ALE AND BEER MEASURE.

| Pints. | Galls. | Firk. | Kilderk. | Bar. | Hbd. |
|--------|----------------|-------|----------|------|----------------|
| 8 | 1 | | | | |
| 68 | $8\frac{1}{2}$ | 1 | | | |
| 136 | 17 | 2 | 1 | | |
| 272 | 34 | 4 | 2 | | 1 |
| 408 | 51 | 6 | 3 | | $1\frac{1}{2}$ |

The ale gallon contains 282 cubic inches.

In London, the ale firkin contains 8 gallons, and the beer firkin 9; the other measures above it being decreased and increased in the same proportion.

(67.) OF DRY MEASURE.

| Pints. | Galls. | Pecks. | Bush. | Combs. | Quar. | Wys. | Last. |
|--------|--------|--------|-------|--------|-------|------|-------|
| 8 | 1 | | | | | | |
| 16 | 2 | 1 | | | | | |
| 64 | 8 | 4 | 1 | | | | |
| 256 | 32 | 16 | 4 | 1 | | | |
| 512 | 64 | 32 | 8 | 2 | 1 | | |
| 2560 | 320 | 160 | 40 | 10 | 5 | 1 | |
| 5120 | 640 | 320 | 80 | 20 | 10 | 2 | 1 |

The gallon [dry measure, contains $268\frac{1}{4}$ cubic inches. At London 36 bushels of coals make a chaldron. A bushel water measure is 5 pecks.

By dry measure all dry wares, such as corn, seeds, fruits, roots, sand, salt, coals, oysters, muscles, cockles, &c. are measured.

OF SCOTS DRY MEASURE.

| Lippies. | Pecks. | Firlots. | Bolls. | Chaldrons. |
|----------|--------|----------|--------|------------|
| 4 | 1 | | | |
| 16 | 4 | 1 | | |
| 64 | 16 | 4 | 1 | |
| 1024 | 256 | 64 | 16 | 1 |

(68.) OF TIME.

| Minutes. | Hours. | Days. | Weeks. | Month. |
|----------|--------|-------|--------|--------|
| 60 | 1 | | | |
| 1440 | 24 | 1 | | |
| 20080 | 168 | 7 | 1 | |
| 40320 | 672 | 28 | 4 | 1 |

The minute is divided into 60 seconds, and the second may be supposed to be divided into 60 fourths, &c.

(69.) EXAMPLE I. OF REDUCTION DESCENDING.

How many minutes in 29 days 12 hours 45 minutes, or a lunar month?

29 ds. 12 hs. 45 ms.

| | |
|-------|--|
| 24 | |
| 128 | |
| 58 | |
| 708 | |
| 60 | |
| 42525 | |

(70.) EXAMPLE II. OF REDUCTION ASCENDING.

How many pounds, &c. in 35682 pence?

| | |
|----------------|--|
| 12)35682 | |
| 20)29738. 6d. | |
| 148l. 13s. 6d. | |

PART. II.

COMPOUND ARITHMETIC.

SECT. I. COMPOUND ADDITION.

(71.) Compound addition is the finding the sum of several compound numbers.

(72.) RULE 1. Place the numbers of the same denomination under each other according to the directions given in simple addition.

2. Add up the figures in the lowest denomination as in simple addition.

3. Find how many units of the next higher denomination are contained in the sum, by dividing it by so many as of this name make one of the next, or any other way.

4. Write the remainder or overplus underneath, and carry the ones or units to the figures in the next denomination, whose sum you must find and proceed with as before; and so on, through all the

the denominations to the highest, whose sum must be all written down, which together with the several remainders, will express the total required.

(73.) EXAMPLES.

| Money. | | | Troy Weight. | | |
|--------|----|----|--------------|-----|------|
| £. | s. | d. | lb. | oz. | dwt. |
| 13 | 13 | 4 | 17 | 3 | 15 |
| 17 | 10 | 3 | 2 | 5 | 7 |
| 6 | 4 | 1 | 18 | 1 | 17 |
| 3 | 9 | 2 | 23 | 10 | 13 |
| <hr/> | | | <hr/> | | |
| 40 | 15 | 10 | 61 | 9 | 11 |

SECT. II. COMPOUND SUBTRACTION.

(74.) Compound SUBTRACTION is the finding the difference between two numbers, of which one or both are compound.

(75.) RULE 1. Write the less number under the greater, as directed in compound addition.

1. Then, beginning at the least denomination, subtract the under number of each from the upper, writing their respective remainders below them.

3. But if the under number of any of the denominations be greater than the upper, add so many to the upper as make one of the next higher denomination; then take the under from the sum, writing down the remainder as before, and carry or add one to the under number of the next higher denomination before you subtract it.

(76.) EXAMPLES.

| C | qr | lb | A | R | F | E |
|-------|----|----|-------|---|----|----|
| 13 | 3 | 19 | 15 | 2 | 24 | 18 |
| 4 | 3 | 24 | 12 | 2 | 36 | 7 |
| <hr/> | | | <hr/> | | | |
| 7 | 3 | 23 | 3 | 3 | 28 | 11 |

SECT. III. COMPOUND MULTIPLICATION.

(77.) Compound MULTIPLICATION is the finding of a number which shall contain a given compound number any proposed number of times.

(78.) RULE 1. Write the multiplier under the lowest denomination of the multiplicand.

2. Multiply the number of the lowest denomination by the multiplier, and find how many units of the next higher denomination are contained in the product, as in compound addition.

3. Write down the excess, and carry the ones to the product of the next higher denomination, with which proceed as before; and in like manner with all the other denominations to the highest.

(79.) EXAMPLES.

| £ | s | d | miles | fur. | poles. |
|-------|---|----|-------|------|--------|
| 7 | 9 | 8½ | 31 | 3 | 12 |
| <hr/> | | | <hr/> | | |
| 52 | 7 | 9½ | 345 | 4 | 12 |

See more on this subject under PRACTICE, SECT. VII. RULE 1.

SECT. IV. COMPOUND DIVISION.

(80.) Compound DIVISION is the dividing compound numbers into any proposed number of equal parts.

(81.) RULE 1. Place the divisor and dividend as in simple division.

2. Begin at the highest denomination and divide each by the divisor, writing the quotients under their respective dividends.

3. But if there be a remainder after dividing any of the denominations except the least, find how many of the next lower denomination it is equal to, and add to it the small number (if any) which was in this denomination before; then divide the sum.

(82.) EXAMPLES.

| £ | s | d | yds. | f. | in. |
|-------|---|---|-------|-----|-----|
| 3 | 1 | 8 | 6 | 150 | 1 |
| <hr/> | | | <hr/> | | |
| 9 | 6 | | 12 | 1 | 7½ |

See farther on this subject, under PRACTICE, SECT. VII. RULE 2.

SECT. V. PROPORTION or the RULE OF THREE.

(83.) The Rule of Three is that by which a number is found having the same proportion to a given number, which is between two other given numbers. It is called the Rule of Three, because in each of its questions there are given three numbers at least. And because of its excellent and extensive use, it is often named the GOLDEN RULE.

(84.) RULE, for STATING, or SETTING DOWN the THREE GIVEN NUMBERS.

1. Write down the number which is of the same kind with the answer or number required.

2. Consider whether the answer ought to be greater or less than this number; then write respectively the greater or less of the two remaining numbers on the right of it for the third, and the other on the left for the first number or term.

3. Multiply the 2d and 3d terms together, divide the product by the first, and the quotient will be the answer.

(85.) OBSERVATIONS. 1. When you can conveniently multiply and divide as in compound multiplication and division, it is best to do so.

2. If not, reduce the compound terms to be the lowest name mentioned in them, and the first and third to the same name if they be not so already; then the answer will be of the same name with the 2d term.

3. When there happens to be a remainder after division, reduce it to the name next below the last quotient, and divide by the same divisor, so shall the quotient be so many of the said next name; do this as long as there is any remainder, till you have reduced it to the least name, and all the quotients together will be the answer.

4. If the 1st term, and either the 2d or 3d can be divided by any number, without remainder, let them be divided, and the quotients used instead of them.

(86.) There are four other methods of operation besides the above general one, any of which, when possible, performs the work much sooner, viz.

1. Divide the 2d term by the 1st, multiply the quotient by the 3d, and the product will be the answer.

2. Divide the 3d term by the 1st, multiply the quotient by the 2d, and the product will be the answer.

3. Divide the 1st term by the 2d, divide the 3d by

by the quotient, and the last quotient will be the answer.

4. Divide the 1st term by the 3d, divide the 2d by the quotient, and the last quotient will be the answer.

(87.) EXAMPLE I. To find the value of 14 oz. 8 dwt. of gold, at 3l. 19s. 11d. an ounce.

(88.) EXPLANATION. Having stated the three terms by the general rule, as here annexed, the 2d term is reduced to pence, and the 3d to dwts. these being their lowest denominations, as above directed. The 1st term is also reduced to dwts. that it may agree with the 3d. The 2d term is then multiplied by the 3d, and the product divided by the 1st, according to the general rule, when the answer comes out 13809 pence, and 12 remaining over; which remainder being reduced to farthings, and these divided by the same divisor 20, the quotient is 2 farthings, and 8 remaining. Lastly, the pence are divided by 12 to reduce them to shillings, and these again by 20 for pounds; when the final sum comes out 57l. 10s. 9d. 2q. for the answer.

| | | | | | |
|-------|------|----|-----|----|-----|
| oz | l | s | d | oz | dwt |
| 14 | 3 | 19 | 11 | 14 | 8 |
| 20 | 20 | | | 20 | |
| <hr/> | | | | | |
| 20 | 79 | | 288 | | |
| | 12 | | | | |
| <hr/> | | | | | |
| | 959 | | | | |
| | 288 | | | | |
| <hr/> | | | | | |
| | 7672 | | | | |
| | 7672 | | | | |
| | 1918 | | | | |
| <hr/> | | | | | |

$$2,0)27619,2$$

13809, $\frac{1}{2}$ pence, or

$$12)13809d \ 2\frac{1}{2}qr.$$

$$2,0)115,08.9d. \ 2\frac{1}{2}q.$$

Ans. 57l. 10s. 9d. $2\frac{1}{2}q.$

(89.) EXAMPLE II. How many men must be employed to finish a piece of work in 15 days, which 5 men can do in 24 days?

| | | |
|-------|---|----|
| d | m | d |
| 15 | 5 | 24 |
| | 5 | |
| <hr/> | | |

$$15)120(8 \text{ men. Answer.}$$

$$120$$

SECT. VI. COMPOUND PROPORTION, or the RULE OF FIVE.

(90.) This rule is so called, because that in it there are five numbers or terms given, to find a sixth.—It is often named the *double rule of three*, because its questions are sometimes performed by two operations of the rule of three. Of the five given numbers, three contain a supposition, and the other two a demand; one of the terms of supposition being of the same kind with the number required, and the other two of the same kind as the demanding terms.

(91.) RULE for STATING the FIVE given NUMBERS.

Write down the term of supposition which

is of the same kind with the answer, for the middle term.

2. Take one of the other two terms of supposition, and of the demanding terms, both of a kind; and from the direction given in the RULE OF THREE, consider which places they would possess if a stating were made of them and the middle term only, and place them accordingly; do the same with the other term of supposition and its correspondent demanding one, writing the terms under each other which fall on the right and left of the middle term.

(92.) METHODS of OPERATION.

1. BY TWO OPERATIONS. Take the two upper terms and the middle term, in the same order as they stand, for the first stating of the rule of three; then take the fourth number resulting from the first stating, for the middle term, and the two under terms in the general stating, in the same order as they stand, for the extreme terms of the second stating; and the fourth term resulting from it will be the answer.

2. BY ONE OPERATION. Multiply together the terms of which the one is above the other, on both sides of the middle term; then account the two products and the middle term, as they stand, the three terms of a rule of three stating, and the fourth term thence resulting will be the answer. It is generally best to work by the latter method, viz. by one operation. And after the stating, and before commencing the operation, if one of the two first terms, and either the middle term or one of the two last terms will exactly divide by one and the same number, let them be divided, and the quotients used instead of them; which will much shorten the work.

(93.) EXAMPLE.

If 100 men make 3 miles of road in 27 days, how many days will 150 men make 5 miles?

| | | |
|-------|----|---------|
| men | d | men |
| 150 | 27 | 100 |
| miles | 3 | 5 miles |
| <hr/> | | |
| 450 | | 500 |
| | | 27 |
| <hr/> | | |

$$450)13500(30 \text{ days. Ans.}$$

The same question by two operations.

| | | | | | |
|-------|----|-----|-------|----|-------|
| men | d | men | miles | d | miles |
| 150 | 27 | 100 | 3 | 18 | 5 |
| 100 | | | 5 | | |
| <hr/> | | | | | |

$$150)2700(18 \text{ days}$$

$$3)90(30 \text{ days. Ans.}$$

SECT. VII. RULES of PRACTICE.

(94.) By RULES OF PRACTICE are meant certain expeditious methods of casting up accounts; and they consist of the most general contractions of the rule of three when either the first or third term is 1.

(95.) RULE I. To FIND the PRICE of any INTEGER NUMBER of things. When the number is not very great, multiply the price of 1 or the integer, by the given number whose price is to be found.

found, as in compound multiplication, and the product will be the price required.

(96.) If the multiplier exceed 12, it is commonly best to multiply successively by its component parts, as in simple multiplication. But if the multiplier cannot be exactly produced by the multiplication of small numbers, find the nearest to it, either greater or less, which can be so produced; then after having multiplied continually by the component parts of this number, to or from the last product, add or subtract the produce of so many as it is less or greater than the given number.

(97.) EXAMPLE.

What is the value of 38 cwt. at 11 12s 4d per cwt?

£ s d

11 4

3

4 14 0

12

56 8 0 value of 36 cwt.

3 2 8 — of 2 —

Ans. 59 10 8 — of 38 cwt.

(98.) When the number is very large, as many hundreds or thousands; multiply the price of 1 continually by 10 till it come to the highest denomination, namely twice by 10 for hundreds, twice by 10 for thousands, &c. then multiply the several products, by their respective local units in the given number, which last products place orderly under each other, and add them together for the answer.

(99.) EXAMPLE.

To find the price of 7985 at 7s 10½d.

£ s d

0 7 10½ × 5

10

3 18 11½ × 8

10

39 9 7 × 9

10

394 15 10 × 7

7

2763 10 10 - - - - 7000

355 6 3 - - - - 900

31 11 8 - - - - 80

1 19 5½ - - - - 5

Ans. 3142 8 2½ - - - 7985

(100.) RULE II. When the PRICE of some CERTAIN NUMBER is given, to find the PRICE of the INTEGER, or 1. Divide the given price by its number, as in compound division, and the quotient will be the price of 1 as required. When

the number or divisor exceeds 12, it is best to divide successively by its component parts, as in simple division. But if the divisor cannot be produced by the multiplication of small numbers, divide by it after the manner of long division.

(101.) EXAMPLE.

If 22 cwt. cost 124 4s what is 1?

£ s

2)24 4

11)12 2 price of 11 dwt.

1 2 — of 1 do.

The rent of 172 Acres is 197 1 16s, what is the rent of 1 Acre?

£ s £ s

172)197 16(1 3 per Acre

172

25

20

5 16

5 16

(102.) RULE III. If the GIVEN PRICE of 1 or the INTEGER be an ALIQUOT PART of a PENNY, SHILLING, or POUND, take the same part of the given quantity (whose price is to be found by dividing it by the number of times which the given price of 1 is contained in a penny, shilling, or pound) for the answer in pence, shillings, or pounds respectively.

(103.) EXAMPLE.

23984 at 4d or ¼ of 1s.

3)23984

20)79948 8d

3991 148 8d Answer.

(104.) RULE IV. If the GIVEN PRICE be NO ALIQUOT PART of a penny, shilling, or pound, divide it into several aliquot parts, then work for each by rule 3, and their sum will be the answer. Or, It may often be divided so, that the less will be aliquot parts of the greater; then take the same parts of the prices found for the greater.

(105.) EXAMPLE.

3274 at 13s. 9d.

3274

at 10s. or ¼ l. is 1637

— 3 4d. or ⅓ l. is 545 13 4

— 5 or ⅕ of 3s. 4 is 68 4 2

at 13 9 is L. 2250 1 6

(106.) RULE V. If there be POUNDS in the PRICE, multiply the given quantity by the number of them: and if there be also some ODD MONEY, find its produce by the former rules, and add them together.

(107.) EXAMPLE.

$$\begin{array}{r}
 2596 \text{ at L. 3, 5 s.} \\
 2596 \\
 3 \\
 \hline
 \text{at L. 3 is } 7788 \\
 - 5 \text{ s. is } 649 \\
 \hline
 \end{array}$$

L. 8437 Answer.

(108.) RULE VI. *When there is some ODD WEIGHT, or measure, in the quantity: after having multiplied the price by the number of integers, (if there be any) divide the odd quantity into aliquot parts of the integer, or of the price of each other, and add them all together.*

(109.) EXAMPLE.

3 ton, 5 c. 2 qr. at L. 7 : 9 : 3, per ton.

$$\begin{array}{r}
 \text{L. 7 } 9 \text{ } 3 \\
 3 \\
 \hline
 22 \text{ } 7 \text{ } 9 \\
 5 \text{ c. is } \frac{1}{4} \text{ of a ton, } 1 \text{ } 17 \text{ } 3\frac{1}{4} \\
 2 \text{ qr. is } \frac{1}{10} \text{ of 5 c. } 3 \text{ } 8\frac{1}{2} \\
 \hline
 24 \text{ } 8 \text{ } 9\frac{1}{2}
 \end{array}$$

(110.) RULE VII. *If there be a FRACTION in the GIVEN QUANTITY; after having worked for the integral part, by any of the former rules, find the produce of the fraction, by multiplying the price by the numerator, and dividing the product by the denominator, then add them together for the answer.*

(111.) EXAMPLE.

$$\begin{array}{r}
 1735\frac{1}{2} \text{ at L. 1, 5 s.} \\
 \text{L. 1 } 5 \\
 3 \\
 \hline
 8)3 \text{ } 15(- - - - - 9 \text{ } 4\frac{1}{2} \\
 4)1735 \\
 433 \text{ } 15 \\
 \hline
 \text{Answer L. 2169 } 4 \text{ } 4\frac{1}{2}
 \end{array}$$

SECT. VIII. TARE and TRET.

(112.) GROSS WEIGHT of any commodity is its own weight together with that of its package, whether it be cask, chest, or any thing else.

(113.) TARE is the weight of the package, or an allowance made instead of it. What remains after the tare is taken from the gross, may be called tare futtle, if there be more deductions.

(114.) TRET is an allowance of 4 lb. upon every 104 lb. of tare futtle, on account of dust or other waste. What remains after tret is deducted, may be called tret futtle, if there be any following deduction.

(115.) CLOFF is an allowance of 2 lb. for every 3 cwt. and some say, for every 100 lb. of tret futtle, to make the weight hold good, when sold by retail.

(116.) When all the deductions are made, the last remainder is called NEAT or NET WEIGHT. When the tare is at so much per cwt. it will be best to divide it into aliquot parts of it, as in the Rule of Practice. The tret being four to 104,

or 1 to 26, will be found by taking the 26th part of the tare futtle. In calculating oil and spirits, $7\frac{1}{2}$ lb. neat are allowed to the gallon.

(117.) EXAMPLE.

Gross 17 cwt. 3 qr. 14 lb. tare 12 lb. per cwt. tret 4 to 104, and cloff 2 to 100 or 1 to 50. How much neat?

| | cwt. | qr. | lb. | |
|--------------------|------|-----|------------------|-------------|
| | 17 | 3 | 14 | gross. |
| lb. | | | | |
| 8 = $\frac{1}{14}$ | 1 | 1 | 3 | |
| 4 = $\frac{1}{2}$ | 0 | 2 | 15 $\frac{1}{2}$ | |
| | 1 | 3 | 18 $\frac{1}{2}$ | tare |
| 26 | 15 | 3 | 23 $\frac{1}{2}$ | tare futtle |
| | 0 | 2 | 12 $\frac{1}{2}$ | tret |
| 50 | 15 | 1 | 10 $\frac{1}{2}$ | tret futtle |
| | 0 | 1 | 6 $\frac{1}{2}$ | cloff |
| | 15 | 0 | 4 $\frac{1}{2}$ | neat |

PART III.

VULGAR FRACTIONS.

SECT. I. DEFINITIONS.

(118.) A FRACTION, or broken number, is an expression of one or more parts of any number.

(119.) The number of parts into which a number is supposed to be divided, is called the DENOMINATOR; and the number of those parts expressed by the fraction, is called the NUMERATOR. These two numbers are in general called the TERMS of the fraction.

(120.) If the number of which the fraction is part, or parts, be 1, it is called a SIMPLE FRACTION; and is denoted by the numerator written above the denominator, with a small line between them: So, $\frac{1}{3}$ denotes one third of 1; $\frac{7}{8}$ denotes seven eighths of 1.

(121.) But if the number be different from 1, it is called a COMPOUND, and is denoted by the word *of*, and the number subjoined to the numerator and denominator, expressed as before. $\frac{1}{2}$ of 6, denotes one half of 6; $\frac{2}{3}$ of 8, denotes two thirds of 8; and $\frac{3}{4}$ of $\frac{5}{6}$, denotes three fourths of five sixths of 1.

(122.) Simple fractions, whose numerators are less than their denominators, are called PROPER FRACTIONS. And those whose numerators are equal to or greater than their denominators, are called IMPROPER FRACTIONS.

(123.) The expression formed from an integer and a fraction joined together, is called a MIXED NUMBER. If both the numerator and denominator of a fraction be multiplied or divided by the same number, the fraction will retain its original value. All computations in fractions are founded on this principle.

(124.) The following SIGNS, being frequently used to avoid circumlocution, require to be explained.

$$\left. \begin{matrix} = \\ + \\ - \\ \times \\ \div \end{matrix} \right\} \text{ signifies } \left\{ \begin{matrix} \text{equality,} \\ \text{addition,} \\ \text{subtraction,} \\ \text{multiplication,} \\ \text{division,} \end{matrix} \right\} \text{ and denotes that } \left\{ \begin{matrix} \text{the sums are equal,} \\ \text{the numbers are added,} \\ \text{the less N. is deducted,} \\ \text{the sums are multiplied,} \\ \text{the higher N. is divided,} \end{matrix} \right\} \text{ Thus } \left\{ \begin{matrix} 4 \text{ and } 4 = 8 \\ 8 + 2 = 10 \\ 8 - 2 = 6 \\ 8 \times 2 = 16 \\ 8 \div 2 = 4 \end{matrix} \right.$$

SECT. II. REDUCTION of VULGAR FRACTIONS.

(125.) RULE I. To ABBREVIATE or REDUCE FRACTIONS to LESS TERMS. Divide the terms of the given fraction by any number which will divide them without a remainder: the quotients will be the terms of a new fraction, equal in value to the former: This may be abbreviated again, and the next again, and so on, till it appears that there is no number greater than 1 that will divide them, in which case, the fraction is said to be in its LEAST terms.

(126.) EXAMPLE.

Let $\frac{42}{72}$ be proposed to be abbreviated.

$$\frac{1}{1} = \frac{21}{36} = \frac{7}{12}, \text{ by dividing first by 2 and then by 3.}$$

(127.) If the numerator and denominator, instead of being expressed by single numbers, are expressed by the continual product of several, such numbers are both in the numerator and the denominator may be left out without changing the value of a fraction:

$$\text{Thus } \frac{7 \times 3 \times 8 \times 10}{7 \times 8 \times 11} = \frac{3 \times 10}{11} = \frac{30}{11}$$

(128.) If the fraction must be brought to its least terms at one division, divide its terms by their greatest common measure, which common measure is found by dividing the greater term by the less, and this divisor by the remainder; and so on, always dividing the last divisor by the last remainder, till 0 remain; then is the last divisor the greatest common measure required.

(129.) EXAMPLE. Reduce $3\frac{4}{5}$ to its least terms at one division.

$$\begin{array}{r} \text{First, } 246 \overline{) 372} (1 \\ \underline{126} 146 (1 \\ \underline{120} 126 (1 \\ \underline{120} 6 \end{array} \quad \text{Then } \frac{246 \div 6}{372 \div 6} = \frac{41}{62}$$

the common measure 6)120(20

(130.) RULE II. To REDUCE an IMPROPER FRACTION to its EQUIVALENT WHOLE or MIXT NUMBER. Divide the numerator by the denominator, and the quotient will be the integer or mixed number required.

(131.) EXAMPLES.

$$\frac{12}{3} = 4. \quad \frac{37}{11} = 3\frac{4}{11} \quad \frac{15}{7} = 2\frac{1}{7}$$

(132.) RULE III. To REDUCE an INTEGER to an EQUIVALENT FRACTION of a GIVEN DENOMINATOR. Multiply the integer by the given denominator, and the product will be the numerator required.

(133.) EXAMPLE. Reduce 7 to a fraction whose denominator shall be 4.

$$7 = \frac{7 \times 4}{4} = \frac{28}{4}$$

(134.) RULE IV. To REDUCE a MIXT NUMBER to an EQUIVALENT IMPROPER FRACTION. Multiply the integer by the denominator of the fraction, to the product add the numerator; then the sum written above the denominator will form the fraction required.

(135.) EXAMPLE.—Reduce $2\frac{3}{7}$ to a fraction.

$$2\frac{3}{7} = \frac{2 \times 7 + 3}{7} = \frac{14 + 3}{7} = \frac{17}{7}$$

(136.) RULE V. To REDUCE a COMPOUND FRACTION to an EQUIVALENT SIMPLE ONE. Multiply all the numerators together for the numerator, and all the denominators together for the denominator of the simple fraction required. If part of the compound fraction be an integer or a mixt number, reduce it to a fraction by one of the former cases.

(137.) EXAMPLE.—Reduce $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$ of 5 to a simple fraction.

$$\frac{1}{2} \text{ of } \frac{2}{3} \text{ of } \frac{3}{4} \text{ of } 5 = \frac{1 \times 2 \times 3 \times 5}{2 \times 3 \times 4 \times 1} = \frac{15}{4}$$

(by omitting the common terms, 1, 2, and 3)–

(138.) RULE VI. To REDUCE FRACTIONS of DIFFERENT DENOMINATORS to EQUIVALENT FRACTIONS of a COMMON ONE. If the fractions can be conveniently reduced to a common denominator, by applying or dividing their terms, proceed by that method. But, if not, multiply each numerator continually into all the denominators, except its own, for each new nominator; and multiply all the denominators together for the common denominator. In this and several other operations, when any of the proposed quantities are integers, mixt numbers or compound fractions, they must be reduced by their proper rules, to the form of simple fractions.

(139.) EXAMPLE.—Reduce $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{3}{4}$ to a common denominator.

$$\text{Thus } \frac{1}{2}, \frac{2}{3}, \text{ and } \frac{3}{4} = \frac{12}{12}, \frac{16}{12}, \text{ and } \frac{18}{12}$$

$$\frac{1}{2} = \frac{6}{12}, \frac{2}{3} = \frac{8}{12}, \text{ and } \frac{3}{4} = \frac{9}{12}$$

(140.) RULE VII. To FIND the VALUE of PROPER FRACTIONS in numbers of INFERIOR DENOMINATORS

MINATIONS. Multiply the numerator by the integer, and divide by the denominator.

(141.) **EXAMPLES.**

1. What is the $\frac{4}{7}$ of 21. 2. Required the value of $\frac{2}{3}$ of 21.

$$\begin{array}{r} 21. \quad 6s. \\ 4 \\ \hline 5)9 \quad 4 \end{array}$$

Ans. 11. 16s. 9d. $2\frac{2}{7}q.$

$$\begin{array}{r} 20 \\ 3)40 \text{ (13s. 4d. Ans.)} \\ \hline 1 \\ 12 \\ \hline 12(4d. \end{array}$$

(142.) **RULE VIII.** To REDUCE FRACTIONS to other EQUIVALENT ONES of a DIFFERENT INTEGER; a certain number of the LESS INTEGER being CONTAINED in ONE OF THE GREATER. Consider how many of the less integer make one of the greater; and by that number multiply the numerator if the reduction be to a less integer; or the denominator, if to a greater.

(143.) **EXAMPLES.**

Reduce $\frac{2}{9}l.$ to the fraction of a shilling.

$$\frac{2}{9}l. = \frac{2 \times 20}{9} = \frac{40}{9}s. = \frac{40}{8}s.$$

Reduce $\frac{40}{9}s.$ to the fraction of 11.

$$\frac{40}{9}s. = \frac{40}{9 \times 20}l. = \frac{2}{9}l.$$

If a compound whole number be proposed, reduce it all to the lowest denomination mentioned in it, and proceed as before.

(144.) **RULE IX.** To REDUCE FRACTIONS to EQUIVALENT ONES of a DIFFERENT INTEGER, when a certain number of the LESS is NOT EXACTLY contained in the GREATER. 1. By the last, reduce the given fraction to an equivalent one of such an integer, of which a certain number are contained in the integer to which the fraction must be brought, or which shall contain a certain number of this. 2. By the last also, reduce this fraction to an equivalent one of the integer required.

(145.) **EXAMPLE.**

Reduce $\frac{2}{7}$ of 11. to the fraction of a guinea.

$$\frac{2}{7}l. = \frac{2 \times 20s.}{7} = \frac{2 \times 20}{7 \times 21} \text{ gui.} = \frac{40}{147} \text{ guinea.}$$

SECT. III. ADDITION OF VULGAR FRACTIONS.

(146.) **RULE.** Reduce compound fractions to simple ones, and all to the same integer and denominator if they be different; then add all the numerators together, and set the sum over the common denominator, from the sum of the fractions required. When several fractions are to be collected, it is commonly best first to add those two together which most easily reduce to a common

denominator, then their sum and a third, and so on.

(147.) **EXAMPLE.** What is the sum of $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$ of $\frac{1}{2}$?

$$\frac{1}{2} + 7\frac{1}{2} + \frac{1}{3} \text{ of } \frac{1}{2} = \frac{1}{2} + 7\frac{1}{2} + \frac{1}{6} = \frac{1}{2} + 7\frac{1}{2} + \frac{1}{6} = 7\frac{1}{3} 8\frac{1}{6} \text{ the sum.}$$

SECT. IV. SUBTRACTION OF VULGAR FRACTIONS.

(148.) **RULE.** The same preparations being made here as in addition, take the difference of the numerators and set it over the common denominator; for the difference of the fraction required. In subtracting mixt numbers, when the fraction in the subtrahend is greater than that in the minuend, subtract the numerator of the subtrahend from the denominator, and to the difference add the numerator of the minuend; and carry one to the integer in the subtrahend.

(149.) **EXAMPLES.**

1. What is the difference between $\frac{15}{22}$ and $\frac{11}{17}$?

$$\frac{15}{22} - \frac{11}{17} = \frac{255 - 242}{17 \times 22} = \frac{13}{374} \text{ Ans.}$$

2. What is the difference between $5\frac{1}{2}$ and $2\frac{1}{4}$?

$$5\frac{1}{2} - 2\frac{1}{4} = 5\frac{2}{4} - 2\frac{1}{4} = 3\frac{1}{4} = 3\frac{1}{4}$$

SECT. V. MULTIPLICATION OF VULGAR FRACTIONS.

(150.) **RULE.** Reduce mixt numbers, if there be any, to fractions; then multiply all the numerators together for the numerator, and multiply all the denominators together for the denominator of the product required. A fraction is best multiplied by an integer, by dividing the denominator by it if possible, but if that cannot be done, multiply the numerator by it.

(151.) **EXAMPLE.**

What is the product of $\frac{2}{3}$, $3\frac{1}{2}$, 5, and $\frac{3}{4}$ of $\frac{3}{5}$?

$$\frac{2}{3} \times 3\frac{1}{2} \times 5 \times \frac{3}{4} \text{ of } \frac{3}{5} = \frac{2 \times 13 \times 5 \times 3 \times 3}{3 \times 4 \times 4 \times 5} = 4\frac{1}{2} \text{ Ans.}$$

SECT. VI. DIVISION OF VULGAR FRACTIONS.

(152.) **RULE.**—Having prepared the terms as in multiplication; take the quotient of the numerators and of the denominators if they will exactly divide, for the numerator and denominator of the fraction required; but if that cannot be done, multiply the dividend by the RECIPROCAL of the divisor, for the quotient required. By the reciprocal of a fraction, is meant the fraction got by inverting its terms: so the reciprocal of $\frac{1}{2}$ is $\frac{2}{1}$, and of 5, or $\frac{5}{1}$ is $\frac{1}{5}$. A fraction is divided by an integer by dividing the numerator by it, if possible; but if it will not exactly divide, then multiply the denominator by it.

(153.) **EXAMPLES.**

1. What is the quotient of $\frac{25}{9}$ by $\frac{5}{3}$?

$$\frac{25}{9} \div \frac{5}{3} = \frac{25 \div 5}{9 \div 3} = \frac{5}{3} = 1\frac{2}{3} \text{ Ans.}$$

2. What is the quotient of $\frac{5}{9}$ by $\frac{2}{15}$?

$$\frac{5}{9} \div \frac{2}{15} = \frac{5}{9} \times \frac{15}{2} = \frac{5 \times 15}{9 \times 2} = \frac{25}{6} = 4 \text{ Ans.}$$

PART IV.
DECIMAL FRACTIONS.

SECT. I. DEFINITION, NOTATION, AND NUMERATION OF DECIMALS.

(154.) A decimal is a fraction whose denominator is 1 with a cypher or number of cyphers annexed; being always one or more 10th parts, 100th parts, 1000th parts, 10,000th parts, or the like.

(155.) The arithmetic of vulgar fractions is tedious, and even intricate to beginners. The difficulty arises chiefly from the variety of denominators; for when numbers are divided into different kinds of parts, they cannot be easily compared. This consideration gave rise to the invention of decimal fractions, where all the units are divided into similar parts, and the divisions and subdivisions are regulated by the same scale which is used in the Arithmetic of Integers. The first figure of a decimal fraction signifies tenth parts, the 2d hundredth parts, the 3d thousandth parts, and so on.

(156.) Decimals are written down without their denominators, the numerators being so distinguished as to evince what the denominators are; which is done by separating, by a point, so many of the right hand figures from the rest as there are cyphers in the denominator; the figures on the left side of the point being integers, and those on the right decimals. Thus $\frac{1}{10}$ is written 13, and named one tenth; and $\frac{2}{100}$ is written 25, and named two hundredths or hundredth parts. But if there be not a sufficient number of figures in the numerator, cyphers are prefixed to supply the defect: thus $\frac{1}{100}$ is written 01, that is 1 hundredth; and $\frac{15}{1000}$ thus 015, that is 15 thousandths.

(157.) The use of cyphers in decimals, as well as integers, is to bring the significant figures to their proper places, on which their value depends. As cyphers, when placed on the left hand of an integer, have no signification, but when placed on the right hand, increase the value ten times each; so cyphers, when placed on the right hand of a decimal, have no signification; but when placed on the left hand diminish the value ten times each.

(158.) The notation and numeration of decimals will be still more obvious from the following examples:

| | | |
|------|-----------|---|
| 47 | signifies | Four and seven tenth parts. |
| 47 | | Four tenth parts, and seven hundredth parts, or 47 hundredth parts. |
| 47 | | Four hundredth parts, and seven thousandth parts, or 47 thousandth parts. |
| 407 | | Four tenth parts, and seven thousandth parts, or 407 thousandth parts. |
| 407 | | Four, and seven hundredth parts. |
| 4.07 | | Four, and seven thousandth parts. |

The column next the decimal point is sometimes called *decimal primes*, the next *decimal seconds*; and the next *decimal thirds*, and so on.

SECT. II. ADDITION and SUBTRACTION of DECIMALS.

(159.) Write the proposed numbers under each other, according to the value of their places, as in whole numbers; in which order, the decimal points will stand directly below each other: then add or subtract as in whole numbers, placing a decimal point in the sum or difference, straight below the other points.

(160.) EXAMPLES.

1693

2748

21397

04

Sum 41079

from 3219

sub. 26481

295419

SECT. III. MULTIPLICATION of DECIMALS.

(161.) Write down the factors, and multiply exactly as in integers, placing the decimal point to the product, so as to make just as many decimals in it, as there are in both factors; and if there be not as many figures in the product, as there ought to be decimals, prefix cyphers to supply the deficiency.

(162.) EXAMPLES.

523

241

523

2022

1046

126043

512

0098

4096

4608

050176

(163.) CONTRACTIONS.

When decimals are to be multiplied by 1, with any number of cyphers, it is done by only removing the decimal point so many places farther to the right hand, as there are cyphers in the multiplier, and subjoining cyphers, if need be.

EXAMPLE.

The product of 513 and 1000 is 513000.

(164.) When the product will contain many more decimals than are necessary for the present purpose, the work may be contracted thus.—Write the units figure of the multiplier straight under such decimal place of the multiplicand, as the last of the product is intended to be, writing the other figures of the multiplier in an inverted order; then, in multiplying, reject all the figures in the multiplicand, which are on the right of the multiplying figures; writing the products down so, that their right hand figures fall straight below each other; and carrying to such right hand figures from the product of the two preceding figures in the multiplicand thus, viz. 1 from 5 to 15, 2 from 15 to 25, 3 from 25 to 35, &c. and the sum of the lines will be the product to the number of decimals required, and will be seldom wrong in the last figure.

Mr. T. M. H.

1896

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(176.) EXAMPLE.

Reduce 9d. to the decimal of a pound.

$$\begin{array}{r} 12\ 9\ 00 \\ \hline 20\ 7500 \\ \hline .0375 \end{array}$$

(177.) CASE II. A COMPOUND NUMBER may be reduced to a superior name, by reducing each of its parts, and taking the sum of the decimals; the best way to do which is this: Write the given numbers under each other, proceeding orderly from the least to the greatest name, for dividends; draw a perpendicular line on the left of these, and on the left of it write opposite to each dividend such a number, for a divisor, as will reduce it to the next superior name; then begin with the upper division, and affix the quotient of each to the next dividend, as a decimal part of it, before it be divided, and the last sum will be the answer.

(178.) EXAMPLE.

Reduce L. 3:12:6½d. to the denomination of pounds.

$$\begin{array}{r|l} 4 & 3 \\ 12 & 6\ 75 \\ 20 & 12\ 5625 \\ & 3\ 628125\ \text{Ans.} \end{array}$$

PART V.
INTEREST.

SECT. I. DEFINITIONS.

- (179.) INTEREST is the premium allowed for the loan of money.
- (180.) The sum lent is called the PRINCIPAL. The sum of the principal and interest is called the AMOUNT.
- (181.) Interest is allowed at so much *per cent.* *per annum*, which premium, *per cent. per annum*, or interest of L. 100 for a year, is called the RATE of interest.
- (182.) Interest is of two sorts, SIMPLE and COMPOUND.

SECT. II. SIMPLE INTEREST.

- (183.) SIMPLE INTEREST is that which is allowed for the principal lent only.
- (184.) RULE I. To FIND the INTEREST for A YEAR, multiply the principal by the rate, and divide the product by 100.
- (185.) II. To FIND the INTEREST for SEVERAL YEARS, multiply the interest of one year by the number of them.
- (186.) III. To FIND the INTEREST for ANY PARTS of a YEAR, as ½, ¼, &c. take the same proportional parts of one year's interest.
- (187.) IV. For ANY NUMBER of DAYS, multiply the interest of a year by them, and divide by 365.
- (188.) EXAMPLE.

What is the interest of L. 225, 10s. for 6½ years, at 4½ *per cent. per annum*?

225½ principal
4½ rate

$$\begin{array}{r} 100\ 1014\ 75 \\ \hline 10\ 1475\ \text{interest for a year} \\ 6 \\ \hline 60\ 8850\ \text{interest for 6 years} \\ 2\ 536875\ \text{interest for } \frac{1}{2} \text{ year} \\ \hline 63\ 421875 \\ \text{or L. } 63 : 8 : 5\frac{1}{2} \text{ d. the interest required.} \end{array}$$

(189.) The above rules for simple interest serve also to calculate *Commission, Brokage, Insurance, the Stocks*, or any thing else rated at so much *per cent.*

SECT. III. COMPOUND INTEREST.

- (190.) Compound INTEREST is that which is allowed, not only for the sum lent, but also for its interest; as it becomes due at the end of each stated time of payment.
- (191.) RULE. Find the amount of the given principal for the time of the first payment, by simple interest; then consider this amount as the principal for the second payment, whose amount calculate in the same manner; and so on through all the payments, still accounting the last amount as the principal of the next payment.
- (192.) EXAMPLE.

What will L. 50 amount to in 3 years, at 5 *per cent. per annum*, compound interest?

$$\begin{array}{r} \text{To } 50 \text{ principal} \\ \text{add } 2\ 5 \text{ interest for 1 year} \\ \hline 52\ 5 \text{ principal for second payment} \\ 2\ 625 \text{ interest} \\ \hline 55\ 125 \text{ principal for third payment} \\ 2\ 75625 \text{ interest} \\ \hline 57\ 88125 \end{array}$$

or L. 57 : 17 : 7½ d. } amount required.

(193.) In calculating compound interest for *parts of times*, some authors, for expedition, calculate for a complete time, and then take a part of the result proportionate to the part of the time; but this is not just, as the compound interest does not increase in the early period exactly in proportion to its increase in the late or complete period. In all such calculations therefore, where it is necessary to calculate compound interest, for parts of times, the most expeditious and accurate method is by LOGARITHMS; for though it is possible to make such calculations without them, the trouble is immense; whereas, by logarithms it is as easy to perform the calculations with parts of times of payment, as with whole ones.

SECT. IV. DISCOUNT.

(194.) DISCOUNT or REBATE is the difference between a sum of money due at a certain time to come, and its present worth. The PRESENT VALUE of any sum or debt, due some time hence, is such a sum, as if put to interest, would in the time



compare
place us to
the other,
and, indeed, it
is a simple
question.
The answer is
that we are
not the same,
but we are
different.

can, from the given value of its integer; then find how much of the other quantity this amount will purchase, at the given rate of selling it; or if the quantity be given, from thence find the rate of selling it.

(210.) CASE II. If the quantities of both commodities, with the rate of selling them, be given; to find what quantity of some other commodity or money must be given in case of an inequality of the amount of the first commodities. Calculate the amount of each of the two given commodities; then their difference is the money, or amount of the third commodity to be advanced; whose quantity, from thence and its rate, is easily found.

(211.) CASE III. When, in bartering, one commodity is rated above the ready-money price; to find the quantity and bartering price of the other commodity. As the ready money price of the one is to its bartering price, so is that of the other to its barter price; then the quantity of the latter commodity may be found either from the ready-money or bartering prices.

These are the most general cases in barter, and such questions as are not contained in them, are easily resolved from a little consideration of their nature.

SECT. IV. Loss and GAIN.

(212.) Questions in this rule are such whose solutions determine the LOSS or GAIN upon commodities; of which questions there is a great variety; but they may be all easily solved from a little consideration and the following proportion, viz. that the gains or losses are in proportion as the quantities of goods, &c.

SECT. V. EXCHANGE.

(213.) By exchange is meant the bartering or exchanging of the money of one place for that of another, and, like the bartering of wares, it commonly consists in finding what quantity of the money of one place will be equal to a given sum of another, according to a given course of exchange.

(214.) By course of exchange is meant the variable sum of the money of one place which is proposed to be given for a constant piece or sum of that of another, to serve for the present, as a rate of proportion by which to exchange other sums; and it is sometimes above and sometimes below the par.

(215.) By the PAR of exchange is meant an intrinsic equality between two pieces or sums of money, one of which is the constant piece or sum to which the course is compared. The money in the banks of foreign places is finer or purer than that which is current in them; and the difference between any sum, as valued in the one, and its value in the other, is called *agio*.

(216.) It is by comparing the bank money with the par, that the par is ascertained. The exchange is always supposed to be made in bank money; and if there be a necessity for taking current money in case of a defect of the bank to answer the bill, the more of it must be received, and that in proportion to the *agio*.

I. With IRELAND, AMERICA, and the WEST-INDIES.

(217.) Accounts are kept in Ireland, America, and the West-Indies, in pounds, shillings and pence, as in England; and the exchange *per cent.* sterling; the par being 1081 6s 8d Irish per 1001 sterling, or 11 is 8d per pound: also 51 sterling is accounted worth 71 of the currency of the West-Indies, because of the great plenty of foreign coins there.

II. With HOLLAND, FLANDERS, and GERMANY.

(218.) In these places accounts are kept sometimes in pounds, shillings and pence, as in England; and sometimes in guilders, stivers and pennings. The money of Holland and Flanders is distinguished by the epithet *Flemish*, and they exchange by the pound sterling, the par being 33s 4d Flemish per pound sterling.

IN HOLLAND AND FLANDERS.

- 16 pennings make 1 stiver.
- 20 stivers or 40 pence—1 guilder or florin.
- 8 pennings—1 grote or penny.
- 12 grotes or pence—1 skilling.
- 20 skillings—1 pound.

IN GERMANY.

- 12 pennings—1 shilling lub.
- 16 lubbish shilling—1 mark.
- 6 pennings—1 grote flem.
- 6 lubbish shill.—1 skill. flem.
- 7½ marks lub.—1 pound flem.

III. With FRANCE.

(219.) In France, accounts are kept in livres, sols and deniers; exchange being made by the French crown, the par of which is 25 6d sterling, or 28 5¼ more nearly.

- 12 deniers—a sol or sou, value 0 04
- 20 sols—a livre - - - - 0 94
- 3 livres—1 crown or ecu - - 2 54

IV. With SPAIN.

(220.) In Spain they keep their accounts in piales, rials and mervadies; reckoning 372 mervadies to a rial, and 8 rials to a piastra, by which they exchange, and its par is 48 6d sterling.

V. With ITALY.

(221.) In Genoa and Leghorn they keep their accounts in livres, sols and deniers, as in France, but exchange by the piastra, as in Spain, which in Genoa is accounted 5 livres, and at Leghorn 6. At Venice too, accounts are by some kept in the same manner, and by others in ducats and gros, reckoning 24 gros to a ducat, upon which they exchange, and its par is accounted 48 4d sterling.

VI. With PORTUGAL.

(222.) In Portugal accounts are kept in milreas and reas, reckoning 1000 reas to a milrea, as its name imports; and they exchange by the milrea, the par of which is about 68 8½d or 68 9d sterling.

(223.) GENERAL RULES shewing on what manner computations respecting the comparison of monies are to be made.

I. Reduce the given sum, (if necessary) to that kind of money by which exchange is computed.

II. Reduce this, according to the given rate of exchange, into the corresponding money of the other country.

III. Reduce the exchange of money thus found (if necessary) to the kind of money required.

(224.) EXAMPLES.

I. How much sterling money in 5476 guilders current exchange 36s 3d Flemish per pound sterling agio $2\frac{1}{2}$ per cent.

$$102.5 : 100 :: 5476 \\ 100 \text{ G. Ban.}$$

$$102.5)547600(5342.4 \\ 40 \\ d \text{ ————— } \text{£ } s \text{ } d \\ 36s \text{ } 3d = 435)2136960(491 \text{ } 5 \text{ } 6$$

Here agreeably to the first of the preceding general rules we reduce 5476 guilders current, to 5342.4 Banco by the proportion of 102½ to 100, this again is brought to pence Flemish, by multiplying by 40 the pence in a guilder, and since 36s 3d or 435d Flemish is worth 1l sterling: therefore divide by 435, and the quotient 491l 5s 6d, is the sterling money required.

II. How many current guilders in 100l sterling ex 34s 8d Flem. per £ ster. agio 2 per cent.

$$\begin{array}{r} \text{£ } d \text{ Flem. } \text{£} \\ 1 : 416 :: 100 \\ 100 \\ \hline 41600 \text{ d. Flem. Banco.} \end{array} \quad \begin{array}{r} s \text{ } d \\ 34 \text{ } 8 \\ 12 \\ \hline 416 \end{array}$$

$$100 : 102 :: 41600 \\ 100$$

$$82200 \\ 416000$$

$$100)4243200$$

$$40)42432 \text{ d. current}$$

$$1060 \text{ guil. 16 stivers. Ans.}$$

SECT. VI. ARBITRATION OF EXCHANGES.

(225.) As the course or rate of exchange between one nation and another, is almost continually varying, either by rising or falling, from the variations in the circumstances and balance of trade: the design of arbitration is to remit or draw upon foreign places in such a manner, as shall turn out the most profitable.

(226.) Arbitration is generally divided into two parts, SIMPLE and COMPOUND.

I. SIMPLE ARBITRATION.

(227.) In simple arbitration, the exchanges among three places only are concerned. The PAR of ARBITRATION, or ARBITRATED PRICE, is such a rate of exchange between two places, as shall be in proportion with the rates assigned between each of them and a third place. After this par of arbitration is computed, by comparing it with the

present course of exchange, a person can judge which way to remit or draw to the most advantage, and determine what the advantage shall be.

(228.) Ex. The exchange between London and Amsterdam being 33s 9d per pound sterling, and the exchange between London and Paris 21d per crown; the par of arbitration between Amsterdam and Paris, is required.

ANSWER. By reduction 1l ster. = 240d ster. and 33s 9d Flem. = 404d. Flem.

$$d.\text{ster. } d.\text{Flem. } d.\text{ster. } d.\text{Flem.}$$

$$\text{Then } 240 : 404 :: 32 : 54$$

The par of arbitration therefore, between Amsterdam and Paris is 54d. Flem. per crown.

II. COMPOUND ARBITRATION.

(229.) Compound arbitration respects the cases in which the exchanges between three, four, or more places are concerned.

(230.) A person who knows at what rate he can draw or remit directly, and also hath advice of the course of exchange in foreign places, may trace out a path for circulating his money, through more or fewer of such places, and also in such order, as to make a benefit of his skill and credit: and herein lies the great art of such negotiations.

(231.) But to determine in what order, and through how many places to circulate a bill, a general rule can be given, as it depends entirely upon a person's judgment, and a close attention to the results of former cases of the like kind. The following rules, however, may assist in determining, whether a direct or an assigned circular draft be preferable.

(232.) RULE I. Distinguish the given rates of prices in the circular course, into antecedents and consequents; and place the antecedents in one column, and the consequents in another, on the right, fronting one another, by way of equation. And in this distribution into antecedents and consequents, each consequent must be of the same kind with the next antecedent, and the first antecedent of the same kind with the last consequent, which must be the sum whose value in exchange is required.

II. Multiply the antecedents continually for a divisor, and the consequents continually for a dividend; and the quotient of the products will be the value of the sum required by such exchange.

III. Then compute its value by the direct exchange, or by any other circular exchange, and by comparing the values together you will perceive the most advantageous method.

(233.) EXAMP. If London would remit 1000l Sterling to Spain, the direct exchange being 4:16 per piastre of 272 mervadies; it is required whether will be more profitable, the direct remittance, or by remitting first to Holland, at 35s per £; thence to France, at 58d per crown; thence to Venice, at 100 crowns per 60 ducats; and thence to Spain, at 360 mervadies per ducat.

ANTECEDENTS.

CONSEQUENTS.

| | | |
|-----------------|---|-------------------|
| 1l Sterling | = | 35s or 410d Flem. |
| 58d Flemish | = | 1 crown |
| 100 crowns | = | 60 ducats |
| 1 ducat | = | 360 mervadies |
| 272 mervadies | = | 1 piastre |
| How many piales | = | 1000l. Sterling. |

$$\frac{400 \cdot 60 \cdot 360 \cdot 1000}{58 \times 100 \times 272} = \frac{20 \times 30 \times 45 \times 10}{29 \times 17}$$

= 5750 $\frac{350}{9}$ piaftres = the value of

1000l by the circular exchange.

But 4 $\frac{1}{2}$ d : piaftre :: 1000l or 240000d :

$$\frac{180000 \cdot 96000}{8 \cdot 17} = 5647 \frac{1}{7} \text{ piaftres, the value}$$

by the direct exchange.

4. Thus it is plain that the circular exchange is the moft advantageous, as it produces 0 $\frac{3}{4}$ $\frac{1}{8}$ pias more than the other.

SECT. VII. ALLIGATION.

(235.) Alligation is the method of mixing together feveral fimples of different qualities, fo that the compofition may be of a middle quality : and is commonly diftinguifhed into two principal kinds, denominated *alligation medial*, and *alligation alternate*.

CASE I. ALLIGATION MEDIAL.

(236.) Alligation medial is the method of finding the rate of the compound, from having the rates and quantities of the feveral fimples given.

(237.) RULE. Multiply each quantity by its rate ; then divide the fum of the products, by the fum of the quantities, or the whole compofition ; and the quotient will be the rate of the compound required.

(238.) Ex. A compofition being made of 5 lb of 1 at 7s per lb, 9 lb at 8s 6d per lb, and 14 lb at 10d per lb ; what is a lb of it worth ?

$$\begin{array}{r} 5 \times 7 = 35 \\ 9 \times 9 = 81 \\ 14 \times 10 = 140 \\ \hline 256 \end{array}$$

28 $\frac{9}{13}$ 2 (—6s 10d per lb. Ans.

CASE II. ALLIGATION ALTERNATE.

(239.) Alligation alternate is the method of finding what quantity of each of the fimples, whole rates are given, will compofe a mixture of a given rate ; fo that it is the reverfe of alligation medial, and may therefore be proved by it.

(240.) RULE 1. Write the rates of the fimples in a column under each other. 2. Connect, or link, with a continued line, the rate of each fimple which is lefs than that of the compound, with one of thofe which are greater than the compound ; and each greater rate with one or more of the lefs. 3. Write the differences between the mixture rate and that of each fimple, oppofite the rates with which they are linked. 4. Then if only one difference ftand oppofite any rate, it will be the quantity belonging to that rate ; but if there be feveral, their fum will be the quantity.

(241.) It appears from the above rule, that many of the queftions of this cafe will admit of various answers each ; but from an algebraic procefs it appears that they will all have infinite varieties of answers ; After one or more answers are found by the rule, a great number more are found by increasing or decreasing the quantities in any propor-

tion, or by only increafing or decreafing any one or more fingle pairs of yoke-fellows in any proportion, and leaving the other rates as they are ; but that answer is commonly defired which gives the rates in the leaft integer numbers, and thofe the neareft to each other.

(242.) EXAMPLE. How much corn at 2s 6d, at 3s 8d, at 4s, and at 4s 8d, per bufhel, muft be mixed together, that the compound may be worth 3s 10d per bufhel ?

(243.) Rates.

| | | | | | |
|----|----|----|------|------|---|
| 2 | 10 | 12 | or 2 | at 2 | 6 |
| 2 | 10 | 12 | or 2 | at 3 | 8 |
| 16 | 2 | 18 | or 3 | at 4 | 0 |
| 16 | 2 | 18 | or 3 | at 4 | 8 |

(244.) Sometimes one or more of the ingredients, and fometimes the whole compofition is limited to a certain quantity ; which may be divided into the three following cafes or limitations.

(245.) LIMITATION I. When the whole compofition is limited to a certain quantity, and that is not found from the method of linking, and taking the differences ; augment or diminifh the quantity of each ingredient, in the fame proportion as the given quantity is greater or lefs than the total quantity found from the linking, by faying, As the total quantity fo found, is to the given quantity, fo is the quantity of each ingredient, found by linking, to the required quantity of each.

(246.) LIMITATION II. When one of the ingredients is limited to a certain quantity, and that quantity is not found by the method of linking ; either augment, or diminifh the quantities of all the reft, in the fame proportion as the given quantity is greater or lefs than the quantity of the limited fimple found by linking, by ftating as in the firft limitation : or, only augment, or diminifh in the above proportion, that part of the quantity of the ingredients with which the limited one is linked, which is the difference of the mixture rate and the rate of the limited fimple, and add the refulting quantity to the other parts, inftead of the faid difference ; keeping the quantities of the other fimples unaltered.

(247.) LIMITATION III. If more than one of the fimples be limited, find, by Cafe I, what will be the rate of a mixture made of the given quantities of the limited fimples only ; then confider this as the rate of a limited fimple, whole quantity is the fum of the firft given limited fimples ; from which, and the rates of the limited fimples, by the fecond limitation, calculate the quantity of each.

SECT. VIII. INVOLUTION.

(248.) A power is a number produced by multiplying any given number continually by itfelf a certain number of times.

(249.) Any number is called the *FIRST* power of itfelf ; if it be multiplied by itfelf, the product is called the *second* power, and fometimes the *square* ; if this be multiplied by the firft power again, the product is called the *third* power, and fometimes the *cube* ; and if this be multiplied by the firft power again, the product is called the *fourth* power ; and fo on ; that is, the power is denominated from the number which exceeds the multiplications by 1.

Thus :

Thus :

Thus: 3 is the first power of 3.

$3 \times 3 = 9$ is the second power of 3.

$3 \times 3 \times 3 = 27$ is the third power of 3.

$3 \times 3 \times 3 \times 3 = 81$ is the fourth power of 3.

&c.

&c.

(250.) Involution is the finding of powers; to do which, from their definition there evidently arises this RULE. Multiply the given number, or first power, continually by itself, till the number of multiplications be 1 less than the index of the power to be found, and the last product will be the power required.

(251.) EXAMP. 1 What is the cube of 12.5?

$12.5 \times 12.5 \times 12.5 = 1953.25$ Answer.

2 What is the square of $3\frac{1}{2}$ or 3.5 ?

$3.5 \times 3.5 = 12.25$

$12.25 = 12.25$ Answer.

5 5 25

SECT. IX. EVOLUTION.

(251.) The root of any given number, or power, is such a number, as being multiplied by itself a certain number of times, will produce the power; and it is denominated the first, second, third, fourth, &c. root, respectively, as the number of multiplications made of it to produce the given power is 0, 1, 2, 3, &c. that is, the name of the root is taken from the number which exceeds the multiplications by 1, like the name of the power in involution.

(252.) EVOLUTION is the finding of the roots of numbers, either accurately, or in decimals to any proposed extent.

(253.) The power is first to be prepared for extraction, or evolution, by dividing it from the place of units; to the left hand in integers, and to the right in decimal fractions, into periods, containing each as many places of figures as are denominated by the index of the root, if the power contain a complete number of such periods: if it do not, the defect will be either on the right hand, or left, or both; if the defect be on the right hand, it may be supplied by annexing cyphers, and after this whole periods of cyphers may be annexed to continue the extraction with, if necessary; but if there be a defect on the left, such defective period must remain unaltered, and is accounted the first period of the given number, as if it were complete.

(254.) This division may be conveniently made by writing a point over the place of units, and also over the last figure of every period on both sides of it; that is, over every second figure if it be the second root, over every third if it be the third root, &c.

Thus to point this number 21035896.12735;

for the second root, it will be 21035896.127350;

and for the third root, thus 21035896.127350;

(255.) The root will contain just as many places of figures as there are periods or points in the given power; and they will be integers, or decimals respectively, as the periods are so from which they are found, or to which they correspond, that is, there will be as many integer or decimal fi-

gures in the root, as there are periods of integers or decimals in the given number.

(256.) TO EXTRACT THE SQUARE ROOT.

I. Having pointed the given number into periods of two figures each, find a square number either equal to, or the next less than the first period; which subtract from it, and place the root of the square on the right of the given number, after the manner of a quotient in division, for the first figure of the root required.

II. To the remainder annex the second period for a dividend; and on the left hand of it write the double of the root already found, after the manner of a divisor.

III. Consider what figure, which, if annexed to the divisor, and the result multiplied by it, the product may be equal to, or the next less than the dividend, and it will be the next figure of the root.

IV. From the dividend subtract the product, and to the remainder bring down the next period, for a new dividend: to which as before, find a divisor by doubling the figures already found in the root; and from these find the next figure of the root, as in the last article; and continue the operation still in the same manner, till all the periods be used, or as far as you please.

(257.) When the root is to be extracted to a great number of places, the work may be much abbreviated thus: having proceeded in the extraction, after the common method, till half the required number of figures in the root is found, the rest may be found by dividing the last remainder by its corresponding divisor, annexing a cypher to every individual, as in division of decimals; or rather, without annexing cyphers, by omitting continually the right-hand figure of the divisor, after the manner of contractions in division of decimals, § 169.

So the operation for the root of 2 to 12 or 13 places, may be thus.

2 (1.41421356237 + root

24 | 100
4 | 96

281 | 400
1 | 281

2824 | 11900
4 | 11296

28282 | 60400
2 | 56564

282841 | 383600
1 | 282841

2828423 | 1007,900
3 | 8485269

2828426) 1590631 (56237 +
176418
6712
1055
206
8

(258.) By means of the square root also we readily find the 4th root, or the 8th root, or the 16th root, &c. that is, the root of any power whose index is some power of the number 2; namely, by extracting so often the square root as is denoted by that power of 2; that is, two extractions for the fourth root, three for the 8th root, and so on.

(259.) To EXTRACT the CUBE ROOT.

I. Having divided the given number into periods of three figures each, find the nearest less cube to the first period; set its root in the quotient, and subtract the said cube from the first period; to the remainder bring down the second period, and call this the RESOLVEND.

II. To three times the square of the root, just found, add three times the root itself, setting this sum more to the right than the former, and call this sum the divisor. Then divide the resolvend, wanting the last figure, by the divisor, and the next figure of the root, which annex to the former; calling this last figure e , and the part of the root before found call a .

III. Add together these three products, namely, thrice a square multiplied by e , thrice a multiplied by e square, and e cube; setting each of them more to the right than the former, and call the sum the SUBTRAHEND; which must not exceed the resolvend; and if it does, then make the last figure e less, and repeat the operation for finding the subtrahend.

IV. From the resolvend take the subtrahend, and to the remainder join the next period of the given number for a new resolvend; to which form a new divisor from the whole root now found; and from thence another figure of the root, as directed in article II, &c.

(260.) Ex. To extract the cube root of 48228.544

$$\begin{array}{r|l} 3 \times 3^2 = 27 & 48228.544 \text{ (36.4 root.)} \\ 3 \times 3 = 09 & 27 \\ \hline \text{Divisor } 279 & 21228 \text{ resolvend} \end{array}$$

$$\left. \begin{array}{l} 3 \times 3^2 \times 6 = 162 \\ 3 \times 3 \times 6^2 = 324 \\ 6^3 = 216 \end{array} \right\} \text{add}$$

$$\begin{array}{r|l} 3 \times 36^2 = 3888 & 19656 \text{ subtrahend} \\ 3 \times 36 = 108 & \\ \hline 38988 & 1572544 \text{ resolvend} \end{array}$$

$$\left. \begin{array}{l} 3 \times 36^2 \times 4 = 15552 \\ 3 \times 36 \times 4^2 = 1728 \\ 4^3 = 64 \end{array} \right\} \text{add}$$

$$1572544 \text{ subtrahend}$$

$$0000000 \text{ remainder}$$

(261.) To EXTRACT any ROOT WHATEVER.—Let G be the given power or number, n the index of the power, find by trials a power nearly equal to the given power or number, and having a rational root. Let this assumed power be A and its root r , and let R be the required root of G .

Then as the sum of $n+1$ times A and $n-1$ times G , is to the sum of $n+1$ times G and

$n-1$ times A , so as the assumed root r , to the required root R .

Or, as half the said sum of $n+1$ times A and $n-1$ times G , is to the difference between the given and assumed powers, so is the assumed root r , to the difference added between the true and assumed roots: which difference added or subtracted gives the true root nearly.

$$\text{That is, } n+1.A + n-1.G : n+1.G + n-1.A :: r : R.$$

$$\text{Or, } n+1.\frac{1}{2}A + n-1.\frac{1}{2}G : A \text{ or } G :: r : R \text{ or } r.$$

And the operation may be repeated as often as we please, by using always the last found root for the assumed root, and its n th-power for the assumed power A .

(262.) Ex. To extract the 5th root of 21035.8. Here it appears that the 5th root is between 7.3 and 7.4. Taking 7.3, its 5th power is 20730.71593. Hence then we have

$$G=21035.8; r=7.3; n=5; \frac{1}{2}.n+1=3; \frac{1}{2}.n-1=2.$$

$$A=20730.716$$

$$G-A=305.084$$

$$\begin{array}{r} A=20730.716 \quad G=21035.8 \\ \quad \quad \quad 3 \quad \quad \quad 2 \end{array}$$

$$\begin{array}{r} 3A=62192.148 \quad 42071.6 \\ 2G=42071.6 \end{array}$$

$$\text{As } 104263.7 : 305.084 :: 7.3 : .0213605$$

$$73$$

$$915252$$

$$2135588$$

$$104263.7)2227.1132(.0213605 \text{ the diff.}$$

$$14184 \quad 7.3 = r \text{ add}$$

$$3758$$

$$630$$

$$5$$

$$7.321360 = R \text{ the root true to the last figure.}$$

(263.) GENERAL RULES for EXTRACTING ANY ROOT out of a Vulgar Fraction or Mixt Number.

I. If the given fraction have a finite root of the kind required, it is best to extract the root out of the numerator and denominator, for the terms of the root required.

II. But if the fraction be not a complete power, it may be thrown into a decimal, and then extracted. Or,

III. Take either of the terms of the given fraction for the corresponding term of the root; and for the other term of the root, extract the required root of the product, arising from the multiplication of such a power of the first assigned term of the root whose index is less by 1 than that of the given power, by the other term of the given number. This rule will do when the root is either finite or infinite.

IV. Mixt numbers may be reduced either to improper fractions or decimals, and then extracted.

(264.) THIS rule is also called FALSE POSITION, or false supposition, because it makes a supposition of false numbers, as if they were the true ones, and by their means, discovers the true numbers sought.

sought. The single rule uses only one supposition, but the double rule only two; whence their names.

(265.) To the rule of position belong such questions as cannot be solved by the direct process by any of the former rules; and in which the required number or numbers do not ascend above the first power; such, for example, as most of the questions usually brought to exercise the reduction of simple equations in algebra. But it will not bring out true answers, when the numbers sought ascend above the first power; for then the results are not proportional to their positions, nor the errors to the difference of the true number and each position; yet, in all such cases, it is a very good approximation, and in exponential equations, as well as many other things, succeeds better than perhaps any other method.

(266.) Those questions, in which the results are proportional to their suppositions, belong to single position; such are those which require the multiplication or division of the number sought by any number, or in which it is to be increased or diminished by itself any number of times; or by any part or parts of it. But those in which the results are not proportional to their positions, belong to the double rule; such are those, in which the number sought is increased or diminished by some given number, which is no known part of the number required.

(267.) RULE. Take any number, and perform the same operations with it as, in the question, are described to be performed with the number sought; then, if the result be the same with that in the question, the supposed number is the number sought; but if it be not, say, as the result of the operation is to the position, so is the result in the question to the number required.

(268.) EXAMPLE.

A person after spending $\frac{1}{3}$ and $\frac{1}{4}$ of his money, has yet remaining L. 60; what had he at first?

| 1. Suppose he had at first L. 120. | PROOF. |
|------------------------------------|----------------------------|
| Now $\frac{1}{3}$ of 120 is 40 | $\frac{1}{3}$ of 144 is 48 |
| $\frac{1}{4}$ of it is 30 | $\frac{1}{4}$ of it is 36 |
| their sum is 70 | their sum 84 |
| which taken from 120 | taken from 144 |
| leaves 50 | leaves 60 |
| | as per question. |

$$\text{Then, } 50 : 120 :: 60 : \frac{60 \times 120}{50} = \frac{60 \times 12}{5} \\ = 12 \times 12 = 144.$$

SECT. XI. DOUBLE POSITION.

(269.) RULE. Having taken any two convenient numbers, for the positions, proceed with each, according to the conditions of the question, as if it were the true number sought; and find how much the results are different from the result in the question. Next multiply each of these errors or differences by the other's position; then if the errors be of the same affection, that is, if the results be both either too great or too little, divide the difference of the products by the difference of errors, and the quotient will be the answer;

but if the errors be of different affections, that is, if one result be too great, and the other too little, divide the sum of the products by the sum of the errors, and the quotient will be the answer.

(270.) Or, having found the errors, say, As the sum or difference of the errors, according as they are of a different, or the same kind, is to the difference of the suppositions, so is the least error to the correction of the supposition belonging to this error; which must be added to, or subtracted from it, according to the following conditions, viz. If the errors be of the same kind, add, or subtract the correction, to or from this supposition, according as it is greater or less than the other supposition; but if the errors be of different kind, add, or subtract, according as the supposition is the less or the greater of the two; and the sum, or difference will be the number sought.

(271.) EXAMPLE.

What number is that, which being multiplied by 6, the product increased by 18, and the sum divided by 9, the quotient will be 20?

First, suppose 30 to be the number sought.

$$\text{Then } \frac{30 \times 6 + 18}{9} = 10 \times 2 + 2 = 20 + 2 \\ = 22; \text{ but ought to be } 20; \text{ therefore the error is } 2 \text{ in excess.}$$

Again, suppose 18 to be the number sought.

$$\text{Then } \frac{18 \times 6 + 18}{9} = 2 \times 6 + 2 = 12 + 2 \\ = 14; \text{ but ought to be } 20; \text{ therefore the error is } 6 \text{ in defect.}$$

And the errors are of different kinds or affections.

$$\text{Whence, by the first rule, } \frac{30 \times 6 + 18 \times 1}{2 + 6} = 8$$

$$= \frac{15 \times 3 + 9}{2} = \frac{54}{2} = 27, \text{ the number sought.}$$

$$\text{And, by the second rule, } 2 + 6 : 30 - 18 :: \\ 2 : \frac{2 \times 12}{8} = 3, \text{ the correction; then } 30 - 3 = \\ 27, \text{ the number sought.}$$

CONCLUSION.

(272.) We cannot conclude our account of the Science, without acknowledging, that in drawing up the above treatise, we have borrowed freely from the celebrated Dr HUTTON's "Complete Treatise on Practical Arithmetic;" though we have by no means restricted ourselves entirely to it. Agreeably to his plan, in treating of the *Rule of Three*, we have omitted the common distinction of it into *direct* and *inverse*, and have adopted his general rule for the operation, which renders it perfectly easy in every respect, and even includes questions of *compound Proportion*. We have also, in treating of DECIMALS, omitted the distinction of APPROXIMATE, CIRCULAR, TERMINATE and INTERMINATE; referring the reader for an account of these branches of decimal arithmetic to the articles, DECIMALS and LOGARITHMS.

have also adopted Dr Hutton's, or rather Sir Isaac Newton's method of *pointing* our decimals, by placing the separating points against the upper part of the figures, to prevent their being mistaken for stops, or pauses in the reading.

(273.) We shall only add, in illustration of what we advanced, (§ 35.) respecting the CYPHER, that, for want of this useful character, the ancients could make no distinction between units, tens, hundreds, &c. by their local situation. They invented numberless characters, (by far too many, indeed,) to express different numbers; but for want of this *representative of nothing*, they could make no distinction of the *value* of figures by their *places*. It is in *this*, that the perfection of modern arithmetic in a great measure consists; the cypher, being the representative of nothing, is ready on

all occasions to supply the place of units, tens, hundreds, &c. to the utmost extent of numeration, (if the paradox may be pardoned, to speak of an *utmost extent* in a case of *infinity*,) as often as the figures, previously occupying these places, require, by addition, multiplication, &c. to be transferred to a higher class. This use of the cypher it must be obvious could not take place, with equal regularity and uniformity, (if, indeed, it could at all,) upon any other plan but that of the DECADARY system. When the sexagesimal arithmetic was invented by Ptolemy, the cypher and the nine digits were not known: and his marks above enumerated (§ 14.) clearly show how imperfect every other system but the decadary, must prove in practice.

I N D E X.

- A.**
ABRAHAM said to have carried arithmetic into Egypt, 7.
ACCOUNTS, manner of keeping in foreign countries, 217—222.
ADDITION, SIMPLE, 38—40. defined, 38. rule, 39. proof, 40. examples, *ib.* COMPOUND, 71—73. rule, 72. examples, 73. of decimals, 159, 160.
AFRICANS, said to be little acquainted with arithmetic, 5.
AGIO defined, 215.
ALL MEASURE, table of, 65.
ALLIGATION, 235—247. definition of, 235. medial, 236—238. alternate, 239—246. rules and examples, 237, 238, 240—244. limitations, 245—247.
AMERICA, some nations of, said to be ignorant of arithmetic, 2. 5. par of exchange with, 217.
ANTIDILOVIANS acquainted with arithmetic, 3, 4.
ANTIQUITY of arithmetic, 3, 4, 6, 7.
APOTHECARIES weight, table of, 60.
ARABIANS introduced the modern numerals into Europe, 15. but did not invent them, *ib.* See **INDIANS**.
ARABIC figures early used by Plamudes, 16. and in England, *ib.* a treatise wrote upon them by Jordanus, 21.
ARBITRATION of exchanges, 225—234. simple, 227, 228. compound, 229—234. rules, 232. examples, 233.
ARCHIMEDES, reason why he could not bring arithmetic to perfection, 35.
ARITHMETIC, etymology and definition of, 1. history of, 2—28. known before the flood, 3, 4. and among the patriarchs, 4, 7. Tyrians, 6. Egyptians, 7. Greeks, 8, 9, 35, and Romans, 10—13, 35. sexagesimal invented, 14. retained after the introduction of the Arabic characters, 17. 22. treatises on arithmetic 18—27. the science perfected, 28, 35. divisions of, 29, 30. simple arithmetic, 31—70. compound, 71—117. decimal, 154—178. commercial, 201—271.
ARITHMETICIANS, account of the most ancient, 7, 9, 14, 16. and eminent, 18—28.
AVOIRDUPOISE weight, table of, 61.
- B.**
BARTER, 208—211. defined, 208. cases, 209—211.
BEER MEASURE, table of, 66.
BILLIONS, numeration of, 36.
BOETHIUS an ancient arithmetician, 20.
BORGO, L. DE, a writer on arithmetic, 24.
BUCKLEY, Mr, early used decimal periods, 23.
- C.**
CALCULATION, etymology of, 8.
CHAMBERS, Dr, his opinion of the origin of arithmetic, 6.
CHARACTERS, the modern numeral, introduced from the Arabians, 15. uncertain by whom invented, 16.
CLOFF, definition of, 115.
CLOTH MEASURE, table of, 63.
COIN, value and weight of, 58.
COMMERCIAL ARITHMETIC, 201—272. introduction, 201. See **BARTER**, **FELLOWSHIP**, &c.
- COMPOUND ARBITRATION**, 229—234.
COMPOUND ARITHMETIC, &c. See **ARITHMETIC**, &c.
COMPOUND INTEREST, 190—193.
COMPOUND PROPORTION, 90—93. defined, 90. rule, 91. methods of operation, 92. example, 93.
CONCLUSION, 272, 273.
COURSE of exchange defined, 214.
CUBE ROOT, extraction of the, 259, 260.
CYPHER, use of the, 31, unknown to the ancients, 35. is the key-stone of arithmetic, *ib.* and has enabled the moderns to perfect the science, *ib.* 273. use of cyphers in decimals, 154, 158.
- D.**
DECADARY system of numeration, the most ancient, 33. natural, 34. and perfect system, 35, 273. might perhaps be extended to weights and measures, 35.
DECIMAL FRACTIONS. See **FRACTIONS**.
DECIMALS, CIRCULATING, first noticed by Dr Wallis, 27.
DECIMALS, first used by Ramus, Buckley, &c. 23. first published by Stevinus, *ib.*
DENOMINATOR, defined, 119.
DISCOUNT, 194—197. definition of, 194. rule, 195. 196. example, 197.
DIVIDEND, defined, 51.
DIVISION, SIMPLE, 50—54. defined, 50. rule, 52. proof, 53. examples, *ib.* 54. contractions, 54. COMPOUND, 80—82. defined,

- fined, 80. rule, 81. examples, 82.
 DIVISOR defined, 51.
 DOUBLE FELLOWSHIP, 205—207, defined, 205.
 DOUBLE POSITION defined, 264. rules of, 269, 270. example, 271.
 DRY MEASURE, table of, 67. Scots, ib.
 E.
 EGYPTIANS early improved arithmetic, 7.
 ELEMENTS of arithmetic, manner of first acquiring the, 34.
 ENOCH's prophecy proves the antiquity of arithmetic, 3.
 EQUATION of payments, 198—200. defined, 198. rule, 199. example, 200.
 EUCLID, the most ancient writer on arithmetic, 18. reason why he could not bring it to perfection, 35.
 EVOLUTION. 251—262. defined, 252. roots defined, 251. rules for preparing them, 253. pointing, 254. and extracting the square root, 256, 258. the cube root, 259, 260. or any root, 261—263.
 EXCHANGE, 213—224. defined, 213. course of, 214. par of, 215, 216. with foreign countries, 217—222. rules, 223. examples, 224. See ARBITRATION.
 EXTRACTION of roots. See EVOLUTION.
 F.
 FABER, a writer on arithmetic, 21.
 FELLOWSHIP, single, 202, 204. double, 205—207. definitions, 202, 205.
 FIGURES, the modern, origin of, 15, 16.
 FLANDERS, par of exchange with, 216. money of, ib.
 FRACTION, simple, defined, 120, compound 121. proper, 122. improper, ib.
 FRACTIONS, DECIMAL, 154—178. defined, 154. origin of, 155. notation and numeration of, 156—158. addition and subtraction of, 159, 160. multiplication of, 161—164. division of, 165—170. reduction of, 171—178.
 FRACTIONS, VULGAR, 118—153. definitions of, 118—123. signs, 124. reduction of, 125—145. addition of, 146, 147. subtraction of, 148, 149. multiplication of, 150, 151. division of, 152, 153.
 FRANCE, par of exchange with, 219. money of, ib.
 G.
 GAIN. See LOSS.
 GENOA, exchange with, 221.
 GERMANY, money of, 218.
 GOGUET, Mr, his derivation of calculation, 8.
 GOLD, value and weight of, 58.
 GREEKS, their ancient methods of calculation, 8, 9. the cause of their small progress in arithmetic, 35.
 GROSS WEIGHT defined, 112.
 H.
 HEINESCHIUS, an improver of arithmetic, 26.
 HISTORY of arithmetic, 2—28.
 HOLLAND, par of exchange with, 218. money of, ib.
 HUTTON, Dr, quoted, 272.
 I. J.
 INDIANS the inventors of our present numerals, 15, 16.
 INDIES. See WEST INDIES.
 INFINITES, arithmetic of, invented by Dr Wallis, 27.
 INTEREST, 179—200. definitions of, 179—182. simple, 183; 189. compound, 190—193. discount, 194—197. equation, 198, 200.
 INVOLUTION, 248—250. definitions of powers, 248, 249. rule and examples, 250.
 JORDANUS, a writer on arithmetic, 21.
 IRELAND, par of exchange, 217.
 ITALY, exchange with, 221.
 K.
 KEY-STONE of arithmetic, 35.
 KIRCHER, his opinion of the Egyptian arithmetic, 7.
 L.
 LAND MEASURE, table of, 64. Scots, ib.
 LEGHORN, exchange with, 221.
 LETTERS, used for numbers, by the Greeks, 9. and Romans, 10—13. and by Ptolemy, 14.
 LIMITATIONS in alligation, 245—247.
 LOGARITHMS invented by Lord Napier, 28. compound interest best calculated by, 193.
 LONG MEASURE, table of, 62.
 LOSS and GAIN, 212.
 LUFFKIN, Mr, his instance of the antiquity of figures, 16.
 M.
 MAUROLÛCÛS, an improver of arithmetic, 26.
 MEASURES and WEIGHTS, a hint towards completing the uniformity of, 35. tables of various, 59—68.
 MILLIONS, numeration of, 36.
 MINUEND, definition of the, 41.
 MIXT NUMBER, defined, 123.
 MONACHUS, B. a writer on arithmetic, 24.
 MONEY, tables of British, 57, 58. and foreign, 218, 219.
 MULTIPLICAND, defined, 45.
 MULTIPLICATION, SIMPLE, 44—49. table, 46. rules, 47. proof, 48. examples, ib. contractions, 49. COMPOUND, 77—79. defined, 77. rule, 78. examples, 79.
 MULTIPLIER, defined, 45.
 N.
 NAPIER, Lord, the inventor of Logarithms, 28.
 NICOMACHUS, account of his theory of arithmetic, 19.
 NOAH, acquainted with arithmetic, 4.
 NONILLIONS, an immense class in numeration, 36.
 NOTATION of the Greeks, 9. Romans, 10—13. and moderns, 15, 16, 17. definition of, 31. that of the ancients, 21. byrith of confusion, 2. perfected by the use of the cypher, ib.
 NUMBERS; wonderful power ascribed to, by the Egyptians, 7. argument respecting the classification of, 32—35. the decadary plan, proved the only natural and practicable one, 33—35. 273.
 NUMERAL letters early used by the Greeks, 9. and Romans, 10—13. and by Ptolemy, 14.
 NUMERATION, definition of, 31. may be carried on to infinity, ib. table of, ib. rule, 31.
 NUMERATOR, defined, 119.
 O.
 OCTILLIONS, a period in numeration, 36.
 P.
 PÆTARRARORINCOURAC, the Indian word for three, 1.
 PAR of exchange explained, 216. how to ascertain it, 216.
 PAYMENTS, equation of, 193—200.
 POSITION, SINGLE, 264—266. defined, 264. DOUBLE, 267. rules, 267, 269, 270. examples, 268, 271.
 POWERS of involution defined, 248, 249.
 PLANUDES, M. early used the modern figures, 16.
 PORTUGAL, money of, and par of exchange with, 221.
 PRACTICE, defined, 94. rules and examples of, 94—111.
 PRINCIPAL defined, 180.
 PRODUCT defined, 45.
 PROPORTION, 83—89. defined, 83.

83. rule, 84—86. examples, 87—89. See COMPOUND.
PELUS, an ancient arithmetician, 20.
TOLOMÆUS, Cl. inventor of the sexagesimal arithmetic, 14.
PYTHAGORAS, his high opinion of arithmetic, 7.

Q

QUADRILLIONS, numeration of, 36.
QUINTILLIONS, numeration of, 36.
QUOTIENT defined, 51.

R

RAMUS early used decimal periods, 23.
REBATE defined, 194.
RECORD, Mr, uses decimals, 23.
REDUCTION, 55—70. defined, 55. and distinguished, ib. rule, 56. tables, 57—68. examples of descending, 69. and ascending, 70.
REGIOMONTANUS excludes the sexagesimal arithmetic, 22.
RESOLVEND defined, 259.
ROMAN numerals, account of the, 10—13. still used for some purposes, 10.
ROMANS, the reason why they did not attain to perfection in their arithmetic, 35.
ROOT, defined, 251. rules to extract the square, 256, 257. the cube, 259, 260. or any root, 261—263.
RULE OF THREE, 83—89. See PROPORTION.
RULE OF FIVE, 90—93. See COMPOUND.
RULES OF PRACTICE, 94—111.

SCHONERUS, Laz. publishes Ramus's treatise, 23.
SCOTS land measure, table of, 64. dry measure, 67.
SEXAGESIMAL arithmetic, account of, 14.
SIGNS explained, 124.
SILVER, value of, 58.
SIMPLE ARBITRATION, 227, 228.
SIMPLE ARITHMETIC, 31—70.
SIMPLE INTEREST, 183—189.
SINGLE FELLOWSHIP, 202—204. defined, 202.
SINGLE POSITION, 264—268. defined, 264. rules, 267, 268.
SPAIN, money of, and par of exchange with, 220.
SQUARE-ROOT, extraction of the, 256, 257.
STEVINIUS, S. author of the first treatise on decimals, 23.
STIFELIUS, a writer on arithmetic, 25.
SUBTRACTION, SIMPLE, 41—43. rule, 42. definition, 41. proof, 43. example, ib. COMPOUND, 74—76. defined, 74. rule, 75. examples, 76.
SUBTRAHEND, definitions of the, 41, 259.

T

TABLE of multiplication, 46.
TABLES of money, 57, 58. 218, 219. weights, 59—61. measures, 62—67. time, 68.
TACQUET, Mr, an improver of arithmetic.
TARE and TRET, 112—117. defined, 113, 114. example, 117.
TARTAGLIA, N. author of the

first entire system of arithmetic, 25.
TENS, proofs that mankind early reckoned by, 3. 4. other numbers supposed to be equally adapted for classification, 32. the contrary proved, 33—35. 273.
TIME, table of, 68.
TRET, defined, 114. See TARE.
TRILLIONS, numeration of, 36.
TROY weight, proportions of, 59.
TYRIANS, probably improvers of arithmetic, 6.

U. V.

VALUE of money, 58. of gold and silver, ib.
VALUE, PRESENT, defined, 194.
VENICE, par of exchange with, 221.
UNIFORMITY of weights and measures, a hint respecting, 35.
UNITS, a period in numeration, 35.
VULGAR FRACTIONS, 118—153. See FRACTIONS.

W.

WALLIS, Dr, proves the early use of Arabic characters in England, 16. author of the arithmetic of infinites, 27.
WEIGHT, GROSS, defined, 112.
WEIGHT, NET, defined, 116.
WEIGHTS, tables of, 59—61. See MEASURES.
WEST INDIES, par of exchange with the, 217.
WINE MEASURE, table of, 65.

X.

XYLANDER translates Psellus's arithmetic, 20.

ARITHMETIC, BINARY, or DYADIC, is that wherein only two figures, unity, or 1, and 0, are used. See BINARY. M. Dancicourt, in the *Miscell. Berol.* gives a specimen of the use hereof in arithmetical progressions.

ARITHMETIC, DECADAL, or ARITHMETIC, DECADARY, } Arithmetic performed by a series of ten characters, such as we now use. See ARITHMETIC, § 32—35, and 273.

ARITHMETIC DECIMAL, the arithmetic of decimal fractions. See ARITHMETIC, INDEX.

ARITHMETIC, DYADIC. See ARITHMETIC, BINARY.

ARITHMETIC, INSTRUMENTAL, a species of arithmetic, wherein the common rules are performed by means of instruments contrived for expedition: such as, several sorts of scales, and sliding rules, &c. particularly those denominated LAPIER'S BONES, which see. The Chinese use instruments in their calculations, and pay little regard to arithmetical rules. See ABACUS, and CHWAN-PAN.

VOL. II. PART II.

ARITHMETIC, LITERAL or SPECIOUS, arithmetic performed by letters instead of figures. See ALGEBRA.

ARITHMETIC, LOGARITHMICAL. See LOGARITHMS.

ARITHMETIC, NUMEROUS, that which is performed by numbers.

ARITHMETIC OF INFINITES, a method invented by Dr Wallis, of summing up a series of numbers, consisting of infinite terms, or of finding the ratios thereof. It is useful in geometry, but every thing performed by it, is more easily operated by FLUXIONS.

ARITHMETIC OF RATIONALS and IRRATIONALS. See RATIONAL, &c.

ARITHMETIC, POLITICAL, is the application of arithmetic to political subjects; as, the strength and revenues of princes, number of inhabitants, births, burials, &c.

ARITHMETIC, SEXAGENARY, or ARITHMETIC, SEXAGESIMAL, } See ARITHMETIC, INDEX.

2. 1. 1.

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1. The repository of the covenant of God with the Jews.—This coffer was of shittim wood, covered with plates or leaves of gold, being two cubits and a half in length, a cubit and a half wide, and a cubit and a half high. It had two rings of gold on each side, through which the staves were put for carrying it. Upon the top of it was a kind of gold crown all around it, and two cherubims were fastened to the cover. It contained the two tables of stone, written by the hand of God. *Calmet*.

(2.) ARK, NOAH'S, CONJECTURES RESPECTING. The ark (See Pl. IV.) has afforded several points of curious inquiry among the critics and naturalists, relative to its form, capacity, materials, &c. The wood whereof the ark was built is called in the Hebrew *gopher wood*, and in the Septuagint *square pines*. Some translate the original *cedar*, others *pine*, others *box*, &c. Pelletier prefers cedar on account of its incorruptibility, and the great plenty of it in Asia; whence Herodotus and Theophrastus relate, that the kings of Egypt and Syria built whole fleets thereof, instead of deal. The learned Mr. Miller, in his *Miscellanies*, has observed, that the wood whereof the ark was built was nothing but that which the Greeks call *κυπαρισσος*, or the *cypress*; for, taking away the termination, *kupar* and *cypar* differ very little in sound. This observation the great Bochart has confirmed, and shown very plainly that no country abounds so much with this wood, as that part of Assyria which lies about Babylon. In what place Noah built and called his ark is no less a matter of dispute. The most probable opinion is, that it was built in Chaldea, in the territories of Babylon, where there was so great a quantity of cypress in the forests and gardens in Alexander's time, that that king built a whole fleet out of it for want of timber. And this conjecture is confirmed by the Arabian tradition, which makes Xisuthrus (another name for Noah) set sail from that country. The time taken to build the ark is also much disputed, some making it 52 years, others 78, 100 &c.

(3.) ARK, NOAH'S, DIMENSIONS, DIVISIONS, &c. The dimensions of the ark, as given by Moses, are 300 cubits in length, 50 in breadth, and 30 in height; which some have thought too scanty, considering the number of things it was to contain; and hence an argument has been drawn against the authority of the relation. To solve this difficulty many of the ancient fathers, and the modern critics, have been put to very miserable shifts: But Buteo and Kircher have proved geometrically, that, taking the common cubit of a foot and a half, the ark was abundantly sufficient for all the animals supposed to be lodged in it. Kircher computes the ark to have been above half a mile in area. Father Lamy shows, that it was 150 feet longer than the church of St Mary at Paris, and 64 narrower: and if so, it must have been larger than St Paul's church in London, from east to east, and broader than that church is high on the inside, and 54 feet of our measure in height. Mr. Arbuthnot computes it to have been 81062 feet long. It contained, besides eight persons of Noah's family, one pair of every species of unclean animals, and 7 pair of every species of clean animals, with provisions for them all during the

whole year. The former appears, at first view, almost infinite; but if we come to a calculation, the number of species of animals will be found much less than is generally imagined; out of which, in this case, are excepted such animals as can live in the water; and bishop Wilkins shows that only 72 of the quadruped kind needed a place in the ark. By the description Moses gives of the ark, it appears to have been divided into three stories, ten cubits or 15 feet high; and it is agreed on, as most probable, that the lowest storey was for the beasts, the middle for the food, and the upper for the birds, with Noah and his family; each storey being subdivided into different apartments, stalls, &c. though Josephus, Philo, and other commentators, add a kind of fourth story, under all the rest; being, as it were, the hold of the vessel, to contain the ballast and receive the filth and feces of so many animals: but F. Calmet thinks, that what is here reckoned a story, was no more than what is called the keel of the ships, and served only for a conservatory of fresh water. Drexelius makes 300 apartments; F. Fournier, 333; the anonymous author of the *Questions on Genesis*, 400; Buteo, Temporarius, Arias Montanus, Hostus, Wilkins, Lamy, and others, suppose as many partitions as there were different sorts of animals. Pelletier makes only 72, viz. 36 for the birds, and as many for the beasts. His reason is, that if we suppose a greater number, as 333 or 400, each of the eight persons in the ark must have had 37, 41, or 50 stalls to attend and cleanse daily, which he thinks impossible to have been done. But it is observed, that there is not much in this: to diminish the number of stalls without a diminution of animals in vain; it being perhaps more difficult to take care of 300 animals in 72 stalls than in 300. As to the number of animals contained in the ark, Buteo computes that it could not be equal to 500 horses; he even reduces the whole to the dimensions of 56 pair of oxen. F. Lamy enlarges it to 64 pair of oxen, or 128 oxen; so that, supposing one ox equal to two horses, if the ark had room for 256 horses, there must have been room for all the animals. But the same author demonstrates, that one floor of it would suffice for 500 horses, allowing nine square feet to a horse. As to the food in the second story, it is observed by Buteo from Columella, that 30 or 40 pounds of hay ordinarily suffices for an ox a day; and that a solid cubit of hay, as usually pressed down in our hay ricks, weighs about 40 pounds; so that a square cubit of hay is more than enough for one ox in one day. Now, it appears, that the second story contained 150,000 solid cubits; which divided between 206 oxen will afford each more hay, by two thirds, than he can eat in a year. Bishop Wilkins computes all the carnivorous animals equivalent, as to the bulk of their bodies, and their food, to 27 wolves; and all the rest to 280 beeves. For the former, he allows 1825 sheep; and for the latter, 109,500 cubits of hay; all which will be easily contained in the two first stories, and a deal of room to spare. As to the third story, no body doubts of its being sufficient for the fowls; with Noah, his sons, and daughters. Upon the whole, the learned bishop remarks, that of the two, it appears much more difficult to assign a number

and bulk of necessary things to answer the capacity of the ark, than to find sufficient room for the several species of animals already known to have been there. This he attributes to the imperfection of our list of animals, especially of those of the unknown parts of the earth; adding, that the most expert mathematician at this day could not assign the proportion of a vessel better accommodated to the purpose than is here done: and hence he concludes, that the capacity of the ark, which had been made an objection against scripture, ought to be esteemed a confirmation of its divine authority; since, in those ruder ages, men, being versed in arts and philosophy, were more obnoxious to vulgar prejudices than now; so that, had it been an human invention, it would have been contrived, according to those notions which from a confused and general view of things as much *too big* as it had been represented too little. Besides the places requisite for the beasts and birds, and their provisions, there was room, therefore, sufficient, for Noah's household utensils, instruments of husbandry, and seeds to sow after the deluge; for which purposes, he might spare room in the third story for 36 cabins; besides a kitchen, a hall, 4 chambers, and a space about 48 cubits in length to walk in.

(4.) **ARK OF THE COVENANT**, a small chest or coffer, three feet nine inches in length, two feet three inches in breadth, and two feet three inches in height, in which were contained the golden pot with manna, Aaron's rod, and the tables of the covenant. This coffer was made of Shittim wood, and covered with a lid of solid gold. See Plate IV. The ark was deposited in the holiest place of the tabernacle. It was taken by the Philistines, and detained 20, some say 40 years, at Kirjath-jearim; but the people being afflicted with emerods on account of it, returned it with divers presents. It was afterwards placed in the temple. The lid of the ark was called the *propitiatory* or *mercy seat*; over which were two figures of cherubims placed, with expanded wings of a peculiar form. Here the Schechinah rested, both in the tabernacle and temple, in a visible cloud; and hence were issued the divine oracles by an audible voice. The high priest appeared before this mercy seat once every year on the great day of expiation; and the Jews, wherever they worshipped, turned their faces towards the place where the ark stood. In the second temple there was also an ark, made of the same shape and dimensions with the first, and put in the same place, but without any of its contents and peculiar honours. It was used as a representative of the former on the day of expiation, and a repository of the original copy of the holy Scriptures, collected by Ezra and the men of the great synagogue, after the captivity.

(5.) **ARK OF THE MODERN JEWS**, &c. In imitation of the ark of the covenant, the Jews to this day have a kind of ark in their synagogues, wherein their sacred books are deposited. This they call *aron*. Leo of Modena gives a description of it, in his Account of the Customs and Ceremonies of those of his Nation. "The Jews (says he,) in the eastern sides of their synagogues, have an ark, or chest, called *ARON*, to the memory of the covenant. In this are preserved the five

books of Moses, written on vellum, with ink made on purpose," &c. Some have supposed that the figure of this ark is still remaining on the triumphal arch of Titus at Rome; though Villapandus and others, with greater reason, are of opinion, that it is the table of shew-bread. *Prideaux's Con.* Vol. i. p. 209. Tertullian calls this ark *Armarium Judaicum*; whence the phrase, *to be in the armory of the synagogue*, q. d. in the number of canonical writings. A chest, very nearly resembling the Jewish ark, and called the *house of the God*, was found in the Huaheine, one of the islands in the south sea. Mr Banks could obtain no other information concerning it than what the name imports.

(II.) **ARK**, in geography, a river in Yorkshire, which falls into the Swale, near Grinton.

(III.) **ARK**, or **ARC**, *arcus*, in geometry, astronomy, &c. See **ARCH**, § 3, 5, 8—10.

ARKENDALE, two villages in Yorkshire, viz. 1. near Applegarth Forest: 2. in the parish of Knaresborough.

ARKESDEN, a village near Newport, Ebor.

ARKHUL. See **ARCOLE**, No. 2.

ARKLEY, a small town in Yorkshire, between Richmond and Westmoreland.

ARKLOW, a sea-port town of Ireland, in the county of Wicklow, 13 miles S. of Wicklow, and 26 from Dublin. It has two representatives in parliament. The tide flows very little on its coast. Long. 6. 5. W. Lat. 52. 42. N.

ARKSEY, a village in Yorkshire, 5 miles N. of Doncaster.

ARKSTON, a small town in Herefordshire, between Druxton and Kingston.

ARLADON, a village in Cumberland, near Whitehaven.

ARLE, a small town in Gloucestershire, a mile from Cheltenham.

(1.) **ARLES**, a large and ancient city of France, in the department of the Mouths of the Rhone, seated on the east side of that river on a hill, whose declivity is towards the north. It was called *ARELAS* by the Romans. Constantine made it the seat of the Roman empire in Gaul; and Boles made it the capital of his kingdom of Burgundy. It is celebrated, for its antiquities, many of which are still to be seen; such as the amphitheatre, the obelisk, the Elysian Fields, the sepulchres, columns with their capitals, busts, pedestals, aqueducts, with some remains of the capitol, and the Roman gods. Under the amphitheatre, in 1661, was found a statue of Venus, which was formerly worshipped in this city; and has been since carried to the castle of Versailles. It is a masterpiece which will always be admired by connoisseurs. The amphitheatre was built by the Romans; some say by Julius Cæsar. It is of an oval form, and about 400 yards in circumference, and the front is 34 yards in height. The middle, called the *arena*, is 142 yards wide, and 104 broad. The porticoes or piazzas are 3 stories, built with stones of a prodigious size. Each of them consists of 60 arches, which still remain; and the walls are of a surprising thickness, but gone to decay. The obelisk is the only one of this kind to be seen in France. It seems to be one of the 40 brought from Egypt to Rome, being of the same oriental granite. They

They are generally full of hieroglyphic characters; but this is quite smooth. In 1675, it was found in a private garden near the walls of the city, not far from the Rhone. It consists of one piece; and is 53 feet high, and 7 in diameter at the base. It is now supported with 4 lions made of bronze; and on the top a blue ball is placed, and over that a sun. The ancient burying place, called the Egyptian Fields lies without the city, upon an agreeable hill, and is divided into two parts. The first called *Moulaires*, has very few tombs, these having been broken to build the walls of gardens.—The 2d called *Elisbamp*, contains a great number. Those of the Pagans have the letters D. M. i. e., *Dis Manibus*. Those of the Christians have a cross. Coins of gold and silver, pieces of bronze, urns, lamps, cups, &c. are often found here. Arles has an academy of sciences, consisting of 30 members, who must be natives, and inhabitants. The city is surrounded with marshy land, which renders the air full of vapours, and makes it unwholesome. The air of the country around, however, is salubrious, and the grounds produce excellent wines, fruits, olives, manna, vermillion, &c. Arles is situated 12 miles S. E. of Nîmes, 5 N. W. of Marseilles, and 430 S. by E. of Paris. Long. 4. 48. E. Lat. 43. 40. N.

(1.) ARLES, a town of France in the department of the Eastern Pyrenees.

ARLESCOTE, a village in Warwickshire, under Edge-hill.

ARLESEY, a village in Bedfordshire, near Bedford.

ARLESHEM, or } A neat town of Switzerland,
ARLESHEIM, } in the canton of Basil.

ARLESTON, a village in Derbyshire, between Know and Findern.

ARLEUF, a town of France in the department of Nièvre.

ARLEUX, a town of France in the department of the North. It is situated in the *ci-devant* province of Hainault, 6 miles S. of Doway, and about as far from Cambray, Long. 3. 10. E. Lat. 50. 26. N.

ARLEY, a village in Warwickshire, W. of Auneaton.

ARLINGHAM, 1. a village in Gloucestershire, near Berkeley almost surrounded by the Severn, which, at this place is near a mile broad and the exhalations from which render the air unhealthy; 2. Another near Gloucester.

ARLINGTON, 1. a village in Bedfordshire, between Harlington, and Shepeston; 2. Another in Gloucestershire near Bybury, and, 3. in Sussex, near Pevensey.

ARLISCOT, a village in Shropshire, near Ford.

ARLON, a town of France, in the department of Forêts, one of those departments, into which the *ci-devant* Austrian Netherlands were lately divided. It is seated on a mountain, 10 miles N. W. of Luxemburg, according to Walker, but according to others 76 miles W. Long. 5. 56. E. Lat. 49. 45. N.

ARLSEY, a village in Yorkshire, N. of Doncaster.

ARLYNG, in ornithology, a name by which the common *seamster* is called in many parts of England.

(1.) * ARM. *n. s.* [*earm, eorm, Sax.*] 1. The limb which reaches from the hand to the shoulder.—If I have lift up my hand against the fatherless, when I saw my help in the gate, then let' mine *arm* fall from my shoulder blade, and mine *arm* be broken from the bone. *Job*.—

Like helpless friends, who view from shore
The labouring ship, and hear the tempest roar,
So stood they with their *arms* across. *Dryden*.

2. The bough of a tree.—

The trees spread out their *arms* to shade her face,
But she on elbow lean'd. *Sidney*.

Where the tall oak his spreading *arms* entwines,

And with the beech a mutual shade combines.

3. An inlet of water from the sea.—

Full in the centre of the sacred wood,
An *arm* ariseth of the Stygian flood.

Dryden's Æneid.

We have yet seen but an *arm* of this sea of beauty. *Norris*. 4. Power; might.—In this sense is used the secular *arm*, &c.—Curst be the man that trusteth in man, and maketh flesh his *arm*, and whose heart departeth from the Lord. *Jer. xvii. 5*.—

O God, thy *arm* was here!
And not to us but to thy *arm* alone,
Ascribe we all. *Shakeſp. Hen. V.*

(2.) ARM, in anatomy. See ANATOMY, INDEX.

(3.) ARM, in gardening, is sometimes used in respect of cucumbers and melons, in the same sense as branch of other plants.

(4.) ARM, in geography, a river in Devonshire.

(5.) ARM, in horsemanship, is applied to a horse, when, by pressing down his head, he endeavours to defend himself against the bit, to prevent his being checked by it. The remedy is, to have a wooden ball covered with velvet, or other matter, put on his chaul, which will so press him between the jaw-bones as to prevent his bringing his head so near his breast.

(6.) ARM, in magnetism. A loadstone is said to be armed, when it is capped, cased, or set in iron or steel, in order to make it take up the greater weight, and also to distinguish readily its poles. See MAGNETISM.

(7.) ARM OF AN ANCHOR, the part to which the fluke is set.

(1.) * To ARM. *v. a.* [*armo, Lat.*] 1. To furnish with armour of defence, or weapons of offence.—And when Abraham heard that his brother was taken captive, he *armed* his trained servants, born in his own house, three hundred and eighteen, and pursued them unto Dan. *Genesis*.—

True conscious honour is to feel no sin;
He's *arm'd* without, that's innocent within. *Pope*.

2. To plate with any thing that may add strength. Their wounded steeds

Yerk out their *armed* heels at their dead masters. *Shakeſp.*

3. To furnish; to fit up; as, to *arm* a loadstone, is to case it with iron.—You must *arm* your hook with the line in the inside of it. *Walton's Angler*.—Having wasted the callus, I left off those tents, and dressed it with others *armed* with digestives. *Wifeman's Surgery*. 4. To provide against.—

Hic

measure, served to frustrate the design, which was also rendered less successful by other accidents. Next day after leaving the port of Lisbon, the armada met with a violent tempest, which sunk some of the smallest of their shipping, and obliged the fleet to put back into the harbour. After some time spent in refitting, they put again to sea. Being descried by Fleming, a Scottish pirate, he immediately informed the English admiral of their approach. Effingham had just time to get out of port, when he saw the Spanish armada coming all sail towards him, disposed in the form of a crescent, and stretching to the distance of 7 miles from the extremity of one division to that of the other. The English admiral, considering that the Spaniards would be much superior to him in close fight, by the size of their ships and the number of their troops, he wisely resolved to content himself with harassing them in their voyage, and with striking attentively all the advantages which might be derived from storms, cross winds, and unlike fortuitous accidents. He soon discerned a favourable opportunity of attacking the vice-admiral Recaldo. This he did in person; and on that occasion displayed so much dexterity in working his ship, and in loading and firing his guns, as greatly alarmed the Spaniards for Recaldo's fate. On that time they kept much closer to one another: notwithstanding which, the English on the next day attacked one of the largest galleasses. Her Spanish ships came up to her relief; but in their hurry one of the principal galleons, which had a great part of their treasure on board, ran ashore, and had one of her masts broken. In consequence of this misfortune she lay to windward, and was taken by Sir Francis Drake; and on the same day took another capital ship, which had been accidentally set on fire. Several rencounters happened, in all of which the English proved victorious, through the great advantage which they derived from the lightness of their ships, and the dexterity of the sailors. The Spaniards did not sufficiently understand nautical sciences, to avail themselves of the unusual magnitude of their ships. The English sailed round them, approached, and retired, with a velocity that amazed them, and did immense execution with their cannon; for while every shot of theirs proved effectual, their ships suffered very little damage from the enemy, whose guns being planted too high, generally spent their force in air. The Spaniards, however, still continued to advance till they came opposite to Calais; where the Duke de Parma, having ordered them to cast anchor, sent word to the Duke of Parma of his arrival, and intreated him to hasten the embarkation of his forces. Farnese accordingly began to put his troops on board; but at the same time informed the Duke of Parma, that, the vessels which he had prepared were proper only for transporting the troops, but were utterly unfit for fighting; and for this reason, the armada were brought still nearer, and the coast cleared of the Dutch ships which had blockaded up Newport and Dunkirk, he could not stir, without exposing his army to certain ruin, the consequence of which would probably be the entire loss of the Netherlands. In compliance with his request, the armada was ordered to advance;

and it had arrived within sight of Dunkirk, between the English fleet on the one hand, and the Dutch on the other, when a sudden calm put a stop to all its motions.

(4.) ARMADA, TOTAL DESTRUCTION OF THE. In this becalmed situation the three fleets remained for one whole day. About the middle of the night a breeze sprung up; and Lord Howard had recourse to an expedient which had been happily devised on the day before. Having filled eight ships with pitch, sulphur, and other combustible materials, he set fire to them, and sent them before the wind against the different divisions of the Spanish fleet. When the Spaniards beheld these ships in flames approaching towards them, it brought to their remembrance the havock which had been made by the fire-ships employed against the Duke of Parma's bridge at the siege of Antwerp. The darkness of the night increased the terror with which their imaginations were overwhelmed, and the panic flew from one end of the fleet to the other. Each crew, anxious only for their own preservation, thought of nothing but how to escape the present danger. Some of them took time to weigh their anchors, but others cut their cables, and suffered their ships to drive with blind precipitation, without considering whether they did not thereby expose themselves to a greater danger than that which they were so solicitous to avoid. In this confusion the ships ran foul of one another: the shock was dreadful, and several of them received so much damage as to be rendered unfit for future use. When day light returned, Lord Howard had the satisfaction to perceive that his stratagem had fully produced the desired effect. The enemy were still in extreme disorder, and their ships widely separated and dispersed. His fleet had lately received a great augmentation by the ships fitted out by the nobility and gentry, and by those under Lord Seymour, who had left Justin de Nassau as alone sufficient to guard the coast of Flanders. Being bravely seconded by Sir Francis Drake and all the other officers, he made haste to improve the advantage which was now presented to him, and attacked the enemy in different quarters at the same time with the utmost impetuosity and ardour. The engagement began at four in the morning, and lasted till six at night. The Spaniards displayed in every rencounter the most intrepid bravery; but, from the causes already mentioned, they did very little execution against the English, while many of their own ships were greatly damaged, and twelve of the largest were either run aground, or sunk, or compelled to surrender. It was now evident that the purpose of the armada was utterly frustrated. The Spanish admiral, after many unsuccessful rencounters, prepared therefore to make his way home; but as the winds were contrary to his return through the Channel, he resolved to take the circuit of the island. The English fleet followed him for some time; and had not their ammunition fallen short, they had obliged the armada to surrender at discretion. Such a conclusion of that vain-glorious enterprise would have been truly illustrious to the English, but the event was scarcely less fatal to the Spaniards. The armada was attacked by a violent storm in passing the Orkneys; and

and the ships, having already lost their anchors, were obliged to keep at sea, while the mariners, unaccustomed to hardships, and unable to manage such unwieldy vessels, allowed them to drive on the western isles of Scotland, or on the coast of Ireland, where they were miserably wrecked. Not one half of the fleet returned to Spain, and a still smaller proportion of the soldiers and seamen. Queen Elizabeth ordered medals to be struck on the occasion with this motto—*AFFLAVIT DEUS ET DISSIPANTUR*.

ARMADABAD. See **AMADABAT**.

ARMA DARE, to give arms, in some ancient charters, signifies to dub, or make a knight.

ARMA DEPONERE, to lay down arms, was a punishment anciently enjoined when a man had committed an offence.

ARMADILLA, in the Spanish American navy, denotes a squadron of men of war, to the number of 6 or 8, from 24 to 50 pieces of cannon, which the king maintains, to prevent foreigners from trading with the Spaniards and the Indians, both in time of war and peace. The vessels of this armadilla are commonly called *guarda costas*. They have even power to take all Spanish merchant-ships they meet with on the coasts, that have not licences from the king. The South sea has its armadilla as well as the North sea. The ordinary abode of the former are at Calao, a port of Lima; that of the latter at Carthage.

(1.) * **ARMADILLO**. *n. s.* [Spanish.] A four-footed animal of Brazil, as big as a cat, with a snout like a hog, a tail like a lizard, and feet like a hedge-hog. He is armed all over with hard scales like armour, whence he takes his name, and retires under them like the tortoise. He lives in holes, or in the water, being of the amphibious kind. His scales are of a bony or cartilaginous substance; but they are easily pierced. This animal hides himself a third part of the year under ground. He feeds upon roots, sugar-canes, fruits, and poultry. When he is caught, he draws up his feet and head to his belly, and rolls himself up in a ball, which the strongest hand cannot open; and he must be brought near the fire before he will shew his nose. His flesh is white, fat, tender, and more delicate than that of a sucking pig. *Trevoux*.

(2.) **ARMADILLO**, in zoology, a synonyme of the *dasy pus*. See **DASYPUS**.

ARMADO. See **ARMADA**, § 1.

ARMAGEDDON, the Hebrew name given to the place where it is thought the Popish and Mahometan troops shall be destroyed under the sixth vial. Its name alludes to Megiddo, where Barak, with 10,000 dispirited, and almost unarmed men, entirely routed, and almost wholly slew, the mighty host of the Canaanites, and may be interpreted *the destruction of troops*. Whether this shall be in Italy, or in Judea, or elsewhere, we dare not positively determine, Rev. xvi. 13, 14. The present appearance of the world, whether Pagan, Catholic, or Christian, has suggested another view of the meaning of the text. The word *Armageddon* literally signifies *the armies of the subtle one*. In Rev. xvi. 13. we find the operation of these unclean spirits mentioned; they are

called the spirits of devils; and as they proceed from the mouth of the dragon, beast, and false prophet, the whole world of the ungodly are included, and therefore their influence is universal, and “they go forth unto the whole world.” In ver. 16. we have the effect of their operation; they are the means by which men are gathered together to the battle of the great day of God Almighty; they are gathered into *one place*, which seems figuratively to import, *one mind*; and if collected, they become the *armies of Satan* to fight in his cause. We pretend not to explain, in a positive manner, this prophetic language; the following ideas are hinted, for those readers who approve to follow out more fully, by comparing other parts of scripture on the subject; those who disapprove, will perhaps forgive the insertion of them. We are the more induced to hazard what is now offered, because, as prophecies are best explained when fulfilled, so the present day seems to be that in which the fulfilment of the prophecy is to be looked for; it immediately precedes the *destruction* of Antichrist; his *decay*, as men confess, is very far advanced. May we attempt to elucidate this prophecy by a simple question, viz. Is there any one *characteristic* of the present day, with which mankind of all nations, ranks, and professions, seem universally tinged, and which seems to be more and more gaining ground? Yes, Infidelity. The diffusion of knowledge, both as to things spiritual by the circulation of the scriptures in the languages of the nations; and as to things temporal by the art of printing, and various concomitant circumstances, tended to unfold the priestcraft by which men had for many ages been kept in bondage. In this century, in particular, not only the mummery of the church of Rome, but the absurdities of her daughters have been exposed. Mankind have been instructed to exercise *reason*; but, forgetting that she was calculated only for this world, for illuminating and directing man, wherever his natural eye pervades; they have foolishly translated the throne of this earth goddess to heaven; where revelation only can illuminate our darkened eyes. Fancifully dreaming that an AGE OF REASON will realize the golden age of the heathen, men are dancing after the footsteps of their goddesses. Turks, Jews, Mahometans, are each, in their degree, following the who lately bore the name of Christians. The contagion is spreading. The effect of infidelity is to fight with God Almighty. Infidelity, therefore, seems to be the last enemy who shall be destroyed. Such, we humbly apprehend to be the meaning of the battle of Armageddon.

(1.) **ARMAGH**, a county of Ireland, bounded by Louth on the S. Lough-neagh, on the N. Tyrone and Monaghan, on the W. and Down, on the E. from which it is separated by the river Newry. It is in length 32 miles, in breadth 17; and is divided into five baronies, containing about 170,620 acres. The climate and soil are good, especially the latter, which is said to be the richest in Ireland; only there is a certain tract called the *Fewes*, that is, *billy* and *barren*. It sends 6 members to parliament, viz. two for the

city of Armagh, two for the county, and two for the borough of Charlemont. Its trade in linen is estimated at L.291,900 Sterling annually.

(1.) ARMAGH, a town of Ireland, which gives name to the county, (See N^o 1.) seated near the river Kalin, about 30 miles S. of Londonderry, and 63 N. of Dublin. It is the see of the primate of all Ireland, and is said to have been founded by St Patrick in the fifth century. In 1142, it was constituted an archbishopric, together with Dublin, Cashel, and Tuam, by cardinal Papyreo, with the consent of the king, dukes, bishops, abbots, and states of Ireland. This Papyreo was sent into Ireland by Pope Eugenius, to reform the abuses that had crept into the church discipline of that country. Armagh had anciently a famous monastery built by St Columbo, or Columinus, about the year 610. The cathedral was often burnt, but as often rebuilt and enlarged, and particularly by Patrick Scanlain, about 1262. Successor Nicholas, son of Molissa, besides rich ecclesiastical vestments, and other things, bestowed on it an annual pension of 20 marks; and he appropriated to his see the manor of Drumskein. He died in 1303. This town was subjected to the English by John de Courcy; it afterwards entirely destroyed by Tir Oen, or Neal, in Queen Elizabeth's time. It was restored, rebuilt, and garrisoned by the English. The see of Armagh by an extent returned in the 14th of James I. is valued at L.400 Sterling *per annum*, and pays so much first fruits to this day. It is reputed to be worth annually L.8000. The episcopate of Armagh is composed of five dignitaries and four prebendaries, who have voices in every plural act. The dignitaries are thus ranked, 1. a dean, chanter, chancellor, treasurer, and ch-deacon. There are also eight vicars choral, an organist, attendant on the service of the cathedral. The vicars choral were anciently few; and of the number only one priest. Primate added another priest, but without increasing the number of vicars. In the year 1720, Primate Lindsay obtained a new charter for enlarging the number of the said vicars to eight, and laid out upwards of L.4000 on a purchase, in augmentation of the estate of the choir.

ARMAGHBREGAH, a village of Ireland in the county of Meath.

ARMAGNAC, a ci-devant province of Guienne in France, 55 miles in length and 40 in breadth; which was the capital town. It now forms part of the department of Gers. It is fertile in corn and wine, and carries on a considerable trade in wool, and bonchretien pears, which are excellent.

ARMA LIBERA, [free arms, Lat.] in ancient times, a sword and lance given to a servant, when he was made free.

ARMAMAR, a town of Portugal, in Beira.

ARMAMAXI, [from *arma*, Lat. arms, and *maxi*, Gr. a carriage,] in antiquity, a kind of chariots or carriages, composed of two wheels, variously adorned with crowns, shields, and plates, and other spoils, carried in procession after the images of the gods and great men.

(1.) * ARMAMENT. *n. f.* [*armamentum*, Lat.]

A force equipped for war; generally used of a naval force.

(2.) ARMAMENT is also used for a storehouse for arms.

* ARMAMENTARY. *n. f.* [*armamentarium*, Lat.] An armoury; a magazine or arsenal of warlike implements. *Dist.*

ARMA MOLUTA, were sharp weapons: Fleta calls them *arma emolita*.

ARMA MUTARE, i. e. to change arms, was a ceremony anciently used to confirm a league.

* ARMAN. *n. f.* A confection for restoring appetite in horses. *Dist.*

ARMANCON, a river of France, in Champagne.

ARMANTHWAITE, the name of 3 villages, viz. 1. in Cumberland, near the Eden, between Kirk-Oswald and Corby-Castle: 2. in ditto, adjoining Onse-bridge, at the foot of Bassingthwaite water. It has a fine view of this beautiful lake; of the romantic hills of Withop on the right, and the lofty Skiddaw on the left; and the distant hills of Borrodale and Keswick terminate the prospect: 3. in Yorkshire near Danby.

ARMA REVERSATA, inverted arms, was a punishment when a man was convicted of felony.

ARMARIUM UNGUENTUM, a sympathetic ointment, by which, in the days of credulity, wounds were believed to be cured, however distant the patient, by only anointing the weapons!

ARMATUM, in ancient physic, a detergent kind of collyrium, of great value in removing asperities of the eye lids. Its chief ingredients were *as ustum*, gum ammoniac, and the roots of the tree *thus*. The preparation is described by Galen, Aetius, Paulus, and Scribonius.

(1.) ARMATURA, armour. See ARMATURE.

(2.) ARMATURA, in the ancient military art, a kind of exercise, performed with missile weapons, as darts, spears, arrows, and the like. It was practised with great diligence among the Romans: they had their *campidoctores*, on purpose to instruct the *tyrones*, or young soldiers in it. Under it were included the throwing of the spear or javelin, shooting with bows and arrows, &c.

(3.) ARMATURA, used personally, was an appellation given to the soldiers who were light armed; as well as those in the emperor's retinue. Of these we find two schools, mentioned in the *Notitia imperii*, called the *armatura seniores* and *armatura juniores*. Their commander was entitled *tribunus armaturarum*.

* ARMATURE. *n. f.* [*armatura*, Lat.] 1. Armour; something to defend the body from hurt.—Others should be armed with hard shells; others with prickles; the rest that have no such *armature*, should be endued with great swiftness and perniciousity. *Ray on the Creation*. 2. Offensive weapons; less properly.—The double *armature* is a more destructive engine than the tumultuary weapon. *Decay of Piety*.

ARMDALE, a village of Scotland, in the county of Sutherland, and parish of Far.

ARMDALE BAY, a bay on the coast of the county of Sutherland in Scotland.

ARMEBOTH, a village of Cumberland, near the river Thurlemyre and Legburth water.

(1.) * ARMED. *adj.* [in heraldry.] Is used in

mans, whose power began to give jealousy to all the princes of Asia. One of the articles of the treaty was, that Mithridates should have the cities and conquered countries, and Tigranes the captives and plunder. In consequence of this, Tigranes was to invade Cappadocia, which he had lately been obliged, by a decree of the senate of Rome, to give up to Ariobarzanes. But before either of the princes took the field, a marriage was solemnized with all possible magnificence between Tigranes and Cleopatra the daughter of Mithridates. Immediately after the nuptials, Tigranes set out on his intended expedition; and Ariobarzanes, on the first news of his march, abandoned his kingdom and fled to Rome. Thus Tigranes, without fighting a stroke, enriched himself with the booty, and then proclaimed Ariarathes, Mithridates's son, king of Cappadocia, to the universal satisfaction of the people. In the mean time the Syrians, being harassed with a long and tedious war of the Seleucidae, invited Tigranes to come and take possession of their country; which he accordingly did, and kept it for 18 years, till he was driven out by Pompey, and Syria reduced to the form of a Roman province. Encouraged by this success, he next invaded Armenia Minor; defeated and killed king Artanes, who opposed him with a considerable army; and in one campaign made himself master of the whole kingdom. From Armenia Minor he marched against the Asiatic Greeks, the Adiabeniensians, the Syrians, and the Gordians, carrying all before him, and obliging the people wherever he came to acknowledge him sovereign. From this second expedition he returned home loaded with booty, which he soon after increased by the spoils of Cappadocia, invading that kingdom a second time at the instance of Mithridates, who had been obliged by the Romans to withdraw his forces from thence. From Cappadocia Tigranes, besides other booty, brought back into Armenia no less than 300,000 captives, having surrounded the country with his numerous forces in such a manner that none could escape. These, together with the prisoners he had taken in his two first expeditions, he employed in building the city of granocerta, which they afterwards peopled. In the mean time Mithridates, who had concluded a peace with the Romans for no other end than to gain time, sent a solemn embassy to Tigranes, inviting him to enter into a second alliance against the common enemy. This he at first declined; but in the end was prevailed upon by his wife Cleopatra to send him considerable supplies, though he never came heartily into the matter, not caring to provoke the Romans, who on their part kept fair with him, taking no notice for the present of the supplies he had sent Mithridates. That unfortunate prince being soon after defeated by Lucullus, was forced to fly for refuge into Armenia, where he met with a very kind reception from his son-in-law, who would neither see him, treat with him, nor own him as his son: however, he promised to protect his person, and allowed him in one of his castles a prince's residence, and a table suitable to his former condition. Though this total overthrow of Mithridates might have opened the eyes of Tigranes,

and made him oppose with all his might the growing power of the Romans, he foolishly left them to finish their conquest of Pontus, while he marched at the head of a very numerous army against the Parthians, with a design to recover from them the dominions they had formerly extorted from him before they set him at liberty. These he easily retook; and, not satisfied with what formerly belonged to him, he added to them all Mesopotamia, the countries that lay about Ninus and Arbela, and the fruitful province of Migdonia; the Parthians, though at that time a mighty people, flying every where before him. From Mesopotamia Tigranes marched into Syria to quell a rebellion which had been raised by Cleopatra surnamed *Seleene*; who, after the death of her husband Antiochus Pius, reigned jointly with her sons in that part of Syria which Tigranes had not seized on. The malecontents were quickly reduced; and the queen herself was taken prisoner, and confined to the castle of Seleucia, where she was soon after put to death by the king's order. From Syria Tigranes passed into Phœnicia, which he subdued either entirely or in great part, spreading far and wide the terror of his arms, in such a manner that all the princes of Asia, except those who were in alliance with the Romans, either in person, or by their deputies, submitted and paid homage to the conqueror. Tigranes, having now subdued all Syria to the borders of Egypt, and being elated with a long course of victories and prosperous events, began to look upon himself as far above the level of other crowned heads. He assumed the title of *king of kings*, and had many kings waiting upon him as menial servants. He never appeared on horseback, without the attendance of four kings dressed in livery, who ran by his horse; and when he gave answers to the nations that applied to him, the ambassadors stood on either side the throne with their hands clasped, that attitude being of all others then accounted among the orientals the greatest acknowledgment of vassalage and servitude. In the midst of all this haughtiness, however, he was unexpectedly visited by an ambassador from Lucullus, the Roman general, who, without any ceremony, told him, that he came to demand Mithridates king of Pontus, who had taken refuge in his dominions, and, in case of his refusal, to declare war against him. Notwithstanding his high opinion of himself, Tigranes returned a mild answer to this message: in which, however, he refused to deliver up his father-in-law; and being highly provoked at Lucullus, for not giving him the title of *king of kings* in his letter, he did not so much as bestow upon him the title of *general* in his answer. In the mean time, being informed, that Zartienus king of the Gordians had entered into a private alliance with the Romans, he put him, his wife, and children, to death; and then, returning into Armenia, received with the greatest pomp imaginable, his father-in-law, Mithridates, whom to that time he had not admitted into his presence, though he had resided a year and eight months in his dominions. They had several private conferences; and at last Mithridates was sent back to Pontus, with 10,000 horse, to raise there what disturbances he

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Tigranes taken arms against his father, and obliged him to divide his troops. The father and son coming to a pitched battle, the latter was defeated, and forced to save himself in Parthia, where he persuaded Phraates, king of that country, to assist him with a numerous army against his father. Phraates having laid siege to Artaxata, Tigranes the elder was obliged to hide himself in the mountainous parts of his kingdom; upon which the king of Parthia returned home. Of this Tigranes the father being apprised, he immediately abandoned the fastnesses of the mountains; and, falling upon his son at Artaxata, dispersed the rebels with great slaughter; and entered his metropolis in triumph. Tigranes the son first fled to Mithridates; but finding him reduced to great straits, having been overcome a few days before, with the loss of 40,000 men, by Pompey, he went over to the Romans, and led them into Armenia against his father as an ally of Mithridates. Tigranes, being now quite dispirited, and unable to make head against the Romans, resolved at last to submit. Accordingly he waited on Pompey in his camp, and having delivered his sword and scepters, prostrated himself before him, and laid his diadem at his feet. Pompey, however, gave him a gracious reception, restored him the kingdom of Armenia, but fined him of 6000 talents for making war on the Roman people without cause. As the king had appealed to the Roman general, for justice against his son, Pompey and both parties the next day, and made the agreement of Gordyene and Sophene; but the treasures that were kept in the latter, he adjudged to the father, because without them he could not pay the fine. The son, being thus disappointed, endeavoured first to make his escape, and afterwards, by private messengers, solicited the inhabitants not to deliver up the treasures to his father. This being taken very much amiss by Pompey, he caused him to be kept in irons; and then he found means to stir up Phraates king of Parthia, whose daughter he had married, against the Romans, and to form a conspiracy against his father's life; whereupon Pompey sent him in chains to Rome, where he was kept prisoner in the house of L. Flavius a senator, till the death of P. Clodius, who, being bribed with a large sum of money, set him at liberty in spite of Pompey and the senate. Tigranes, now thoroughly humbled, willingly yielded to the Romans, Cappadocia, Syria, Cilicia, and that part of Armenia which he possessed, contenting himself with his paternal kingdom; and not only paid the tribute laid upon him, but made large presents to Pompey, and all the officers of his army, which procured him the title of *the friend and ally of the Roman people*. He afterwards entered into a war with Phraates king of Parthia, by whom he was overcome, and would have been driven out of his kingdom, had not a peace been brought about by the mediation of Pompey. He ever after cultivated a strict friendship with the Romans; insomuch that he not only refused to receive Mithridates, who fled to him after he had been routed by Pompey near Mount Stelia, but even offered a reward of 100 talents to any one that would put him to death. His second son also, by name

Sariafter, took up arms against him; but, by the assistance of the Romans, that rebellion was soon after quelled. He died in the 85th year of his age; and was succeeded by his son Artabases, called by Josephus, Artabazes, by Orosius, Artabanes, and by others, Artoadistes. From this time, to the time of Trajan, Armenia was governed by its own kings; but as they were plainly vassals to the Romans, though they did not take that title till the reign of the emperor Nero, their history falls to be considered under that of the Romans. By Trajan, the kingdom of Armenia Major was reduced to the form of a Roman province; but it soon recovered its liberty, and was again governed by its own kings in the reigns of Constantine the Great, and his successors, to whom the kings of Armenia were feudatories.

(5.) ARMENIA MAJOR, MODERN HISTORY OF. In the reign of Justin II. the Saracens subdued Armenia, and held it till the irruption of the Turks, who possessed themselves of this kingdom, and gave it the name of *Turcomania*. The Turks, after the reduction of Armenia, invaded Persia, and other countries subject to the emperors of the east; which gave the Armenians an opportunity of shaking off the Turkish yoke, and setting up kings of their own, by whom they were governed till the country was again subdued by Occadan, or, as some style him, *Hercata*, the son of Cingis, and first cham of the Tartars. Neither was the conquest of Armenia by the Tartars so absolute as to extirpate the race of their kings; seeing we read of Haithon, surnamed the *Armenian*, reigning some time after, and going in person to treat with Mungo, the great cham of Tartary, of the concerns of his kingdom; and in our chronicles we find mention made of Leo king of Armenia, who, in the reign of Richard II. came into England to sue for aid against the Turks, by whom he had been driven from his kingdom. In A. D. 1472, Uffan Cassanes king of Armenia, succeeding to the crown of Persia, made Armenia a province of that empire; in which state it continued till 1522, when it was subdued by Selim II. and made a province of the Turkish empire. Some say that Selim I. reduced it on his return from Persia, where he had gained a complete victory over the great Sophi Ismael. But Sanfovin assures us, that in the reign of Selim I. who died in 1520, both the Lesser and Greater Armenia had their own kings; and adds that Selim caused the head of the king of the lesser Armenia to be cut off and sent to Venice as a mark of his victory. We read no where else of any kings of Armenia after it became a province of Persia. Be that as it will, the Turkish annals cited by Calvisius inform us, that Selim II. conquered Armenia in 1522, ever since which time it has continued subject to the Turks, except the eastern part, which still belongs to the Persians.

(6.) ARMENIA MINOR was bounded on the E. by the Euphrates; on the S. by mount Taurus, which separates it from Cilicia; on the W. and N. by a long chain of mountains called in different places *Mons Scordifus*, *Ananus*, and *Antitaurus*, by which it was separated from Cappadocia. Concerning Armenia Minor we find very little recorded, except what has been already mentioned, and what

In the Holy Week, and meat on the Easter Sunday. Besides the great Lent, they have 4 others of 8 days each, which are instituted to prepare for 4 great festivals of the Nativity, the Ascension, the Annunciation, and of St George; in which times they must not so much as speak of eggs, fish, oil, or butter! The Armenians abstain at all times from eating of blood and things strangled. They have seven sacraments; baptism, confirmation, penance, the eucharist, extreme unction, orders and matrimony. In baptism, the child is plunged 3 times into the water, and the same form of words that is used with us is repeated every time; the priest then puts a small cord made with silk and cotton on the neck of the infant, and anoints his forehead, chin, stomach, arm-pits, hands, and feet, making the sign of the cross on each parts. When the child is baptized, he is carried home by the godfather with sound of drums and trumpets. The women do not go to church till 40 days after their delivery: and they observe many Jewish customs. At the communion, to which infants of two or three months old are admitted, the priests give a piece of the consecrated host soaked in the consecrated wine. The elements are covered with a great veil, and placed in a cup-board near the altar, on the side of the gospels. When the priest takes the chalice and patten, he is followed by his deacons and subdeacons, with flambeaux and plates of copper furnished with bells: in this manner, with a censer before him, he goes in procession round the sanctuary; he then sets them on the altar, pronounces the words of consecration, and turns himself to the people, who fall down, kiss the earth, and beat their breasts; then, after taking it himself, he distributes the host soaked in wine to the people. They consecrate holy water but once a year; at which time every one fills a pot and carries it home, which brings in a considerable revenue to the church. The Armenians seem to place the chief part of their religion in fastings and abstinences; and among the clergy, the higher the degree the lower they must live; in such manner that it is said the archbishops live on nothing but pulse. Temperance is doubtless a virtue, but it is astonishing to what an absurd extreme it has been carried under the name of *religion*; and how much priests of all religions have persuaded mankind that they would recommend themselves to the favour of the Almighty by abstaining from even a moderate use of his benefits! The worst of it is, that these artificial duties and factitious virtues uniformly eradicate the essence of all religion—morality; by leading those who perform them to place great merit, in things of no value.

* **ARMENTAL. ARMENTINE.** *adj.* [*armentalis*, or *armentinus*, Lat.] Belonging to a drove or herd of cattle. *Dict.*

ARMENTIERS, a small but elegant town of France in the department of the North. It was taken by Lewis XIV. in 1667. It is seated on the river Lis, 8 miles N. W. of Lille. Long. 3. 3. E. Lat. 50. 40. N.

* **ARMENTINE.** See **ARMENTAL**.

* **ARMENTOSE.** *adj.* [*armentosus*, Lat.] Abounding with cattle. *Dict.*

ARMENUS. See **ARMENIA**, § 1.

ARMENUS LAPIS, *Armenian stone*, in natural history, a mineral substance, improperly called a stone; being no other than an ochreous earth, and properly called *blue ochre*. It is a very valuable substance in painting, being a bright and lively blue. It was so highly esteemed among the ancients, that counterfeits were commonly attempted. Theophrastus has recorded it as a thing judged worthy a place in the Egyptian annals, which of their kings had the honour of inventing the factitious kind; and he tells us the genuine native substance was a thing of that value, that presents were made of it to great persons, and that the Phœnicians were accustomed to pay their tribute in it.—It is a very beautiful earth, of an even and regular texture; and of a fine blue, sometimes deeper, sometimes paler, and frequently mixed with green. It is soft, tender, and light; of an even, but somewhat dusty surface; it adheres firmly to the tongue, and is dry, but not harsh to the touch. It easily breaks between the fingers, and does not stain the hands. It is of a brackish disagreeable taste, and does not ferment with acids. It is a very scarce fossil; but is found very pure, though in small quantities, in the mines at Gosselaer in Saxony. It is frequently found spotted with green, and sometimes with black; and very often is mixed among the green ochre, called *berggruen* by the Germans, which has thence been erroneously called by its name. See **BICE**.

ARMERIUS. See **DIANTHUS**.

ARMESTON, a village in Northamptonshire, near Polbrook.

ARMETHORP, a village in Yorkshire, near Doncaster.

* **ARMGAUNT.** *adj.* [from *arm* and *gaunt*.] Slender as the arm.—

So he nodded,

And soberly did mount an *armgaunt* steed.

Shakespeare

ARMGRETE, *adj.* as thick as one's arm.

* **ARM-HOLE.** *n. s.* [from *arm* and *bole*.] The cavity under the shoulder.—Tickling is most in the soles of the feet, and under the *armholes*, and on the sides. The cause is the thinness of the skin in those parts, joined with the rareness of being touched there. *Bacon's Natural History*.

ARMIERS, a town of France, in the department of the North, seated on the Sambre, 20 m. S. of Mons, and 8 S. W. of Meaubeuge. Long. 3. 45. E. Lat. 50. 71. N.

ARMIFEROUS, [from *arma*, arms,, and *fero*, to bear.] bearing arms.

ARMIGER, a title of dignity, belonging to such gentlemen as bear arms: and these are either by courtesy, as sons of noblemen, eldest sons of knights, or by creation, such as the king's servants, &c. See **ESQUIRE**.

* **ARMIGEROUS.** *adj.* [from *armiger*, Lat. an armour-bearer.] Bearing arms.

(1.) **ARMILAUSA**, in antiquity, a short military coat, reaching down only to the knee; so called, as being divided both before and behind, and only close about the shoulders, in *armos tantum clausa*, quasi *armiclausura*. The word is sometimes also written, *armiclausura*, *armiclausia*, *armiclausia*, and *armiclausia*.

(2.) **ARMILAUSA**, in ecclesiastical writers,

[illegible]

be comprised in the following five articles; relating to predestination, universal redemption, the corruption of man, conversion, and perseverance: viz. I. "That God, from all eternity, determined to bestow salvation on those who he foresaw would persevere unto the end in their faith in Christ Jesus; and to inflict everlasting punishments on those who should continue in their unbelief, and resist unto the end his divine succours: so that election was conditional, and reprobation in like manner the result of foreseen infidelity and persevering wickedness." II. "That Jesus Christ, by his sufferings and death, made an atonement for the sins of all mankind in general, and of every individual in particular; that, however, none but those who believe in him can be partakers of their divine benefit." III. "That true faith cannot proceed from the exercise of our natural faculties and powers, nor from the force and operation of free will; since man, in consequence of his natural corruption, is incapable either of thinking or doing any good thing; and that therefore it is necessary, in order to his conversion and salvation, that he be regenerated and renewed by the operation of the Holy Ghost, which is the gift of God through Jesus Christ." IV. "That this divine grace, or energy of the Holy Ghost, begins and perfects every thing that can be called good in man, and consequently all good works are to be attributed to God alone; that, nevertheless, this grace is offered to all, and does not force men to act against their inclination, but may be resisted and rendered ineffectual by the perverse will of the penitent sinner." Some modern Arminians interpret this and the last article with a greater latitude. V. "That God gives to the truly faithful, who are regenerated by his grace, the means of preserving themselves in this state;" and though the first Arminians made some doubt with respect to the closing part of this article, their followers uniformly maintain, "that the regenerate may lose true justifying faith, forfeit their state of grace, and die in their sins." The modern system of Arminianism likewise, founded on a liberal and comprehensive plan projected by Arminius himself, as appears from a passage in his last will, extends the limits of the Christian church, and relaxes the bonds of fraternal communion in such a manner, that Christians of all sects and denominations, whatever their sentiments and opinions may be, papists excepted, may be formed into one religious body, and live together in brotherly love and concord. But, to avoid the reproach of being altogether unconnected by any common principles, Episcopius drew up a confession of faith, expressed for the most part in words and phrases of Holy Scripture, which the Arminians have generally adopted, though not enjoined upon them by any authoritative obligation. The Arminians are also called *Remonstrants*, from an humble petition intitled their *Remonstrance*, which, in the year 1610, they addressed to the States of Holland. Their principal writers are, Arminius, Episcopius, Vorstius, Grotius, Curcellæus, Limborch, Le Clerc, and Wetstein; not to mention many others of more modern date. It is generally supposed, that a majority of

the clergy, in both the established churches of Great Britain, favour the Arminian system, in their sentiments and doctrines.

ARMINIUS, James, whose name in Low Dutch was James Harmanni, a famous Protestant divine, from whom the modern sect of Arminians (see the preceding article) take their name, was born at Oude-water, in Holland, 1560. He was ordained minister at Amsterdam on the 11th of August 1588; when he soon distinguished himself by his sermons, which were remarkable for their solidity and learning, and gained him universal applause. Martin Lydias, professor of divinity at Franeker, judging him a fit person to refute a writing in which Beza's doctrine of predestination had been attacked by some ministers of Delft, desired Arminius to undertake the task; which he did, but upon thoroughly examining the reasons on both sides, he came into the opinions he proposed to destroy, and afterwards went still farther than the ministers of Delft had done. In 1600, he opposed those who maintained that ministers should subscribe the confession and catechism every year. In 1602, a pestilential disease raged at Amsterdam, during which he acted with the greatest resolution and courage, in assisting the poor, and comforting the sick; and Lucas Trélatius and Francis Junius dying of that disease at Leyden, the curators of that university chose Arminius professor of divinity there, and afterwards made him D. D. Disputes upon grace were soon after kindled in that university; and he was at length engaged in a new contest, occasioned by a disputation of his concerning the divinity of the Son. These contests, his continual labour, and the concern of seeing his reputation blasted by a multitude of slanders in relation to his opinions, impaired his health and constitution; and threw him into a fit of sickness, of which he died on the 19th of October 1609. Arminius was esteemed an excellent preacher: his voice was low, but very agreeable; and his pronunciation admirable; he was easy and affable to persons of all ranks, and facetious in his conversation amongst his friends. His great desire was, that Christians would bear with one another in all controversies which did not affect the fundamentals of their religion; and when they persecuted each other for indifferent points, it gave him the utmost dissatisfaction. The curators of the university of Leyden had so great a regard for him, that they settled a pension upon his widow and children. He left several works, viz. 1. "Disputationes de diversis Christianæ religionis capitibus." 2. Orationes, itemque tractatus insigniores aliquot. 3. Examen modesti libelli Gulielmi Perkhii de prædestinationis modo et ordine, itemque de amplitudine gratiæ divinæ. 4. Analysis capituli noni ad Romanos. 5. Dissertatio de verò et genuino sensu capituli septimi, epistolæ ad Romanos. 6. Amica collatio cum D. Francisco Junio de prædestinatione per literas habitæ. 7. Epistola ad Hippolytum a collibus."

ARMIRO, a sea port town of Macedonia, in European Turkey, seated on the Gulph de Volo, 30 miles N. W. of Negropont, and 30 S. E. of Larissa. It is reckoned the EPIREIA of the ancients. Long. 23. 40. E. Lat. 39. 42. N.

Your friends are up, and buckle on their *armour*. *Shakeſp.*

—That they might not go naked among their enemies, the only *armour* that Chriſt allows them, is prudence and innocence. *South.*

(2.) **ARMOUR**, FARTHER DEFINITION AND DESCRIPTION OF. Dr Johnson's definition, (§ 1.) is rather incomplete. The word implies a defensive habit, to ſecure the body from the attacks of an enemy. In ancient ſtatutes it is frequently called *armis*. The parts of armour are, the buckler, cuirass, helmet, coat of mail, gantlet, &c. A complete armour anciently conſiſted of a caſque or helmet, a gorget, cuirass, gantlets, taffes, brassets, cuisses, and covers for the legs, to which the pieces were faſtened. This they called *armour à la pie*; and was the habit of the cavaliers and men at arms.—The infantry had only part of it; viz. a pot or head piece, a cuirass, and taffes; but all light. Laſtly, the horſes themſelves had armour, to cover the head and neck. Of all this mixture of war, ſcarce any thing is now retained except the cuirass; the gorget or neck-piece, worn by officers, being at preſent only a badge of honour, and of no defence. The gallantry of going to battle without any defensive armour, prevailed ſo far among the French, during the reign of Louis XIV. that continual ordonnances were iſſued to reſtrain it; in conſequence of which the general officers, and thoſe of the cavalry, were obliged to reſume the cuirass, which however has been but ill obſerved.

* **ARMOUR BEARER**. *n. ſ.* [from *armour* and *bearer*.] He that carries the armour of another.—His *armour bearer* firſt, and next he kill'd His charioteer. *Dryden.*

ARMOUR, COAT, is the eſcutcheon of any perſon, or family, with its ſeveral charges, and other mixture; as mantling, creſt, ſupporters, motto, &c.—Thus we ſay, a gentleman of coat-armour; meaning one who bears arms.

(1.) **ARMOURER**. See **ARMORER**.

(2.) **ARMOURER OF A SHIP**, a perſon whoſe office is to take care that the arms be in a condition for ſervice.

ARMOURERS, in Roman antiquity, were ſet apart in certain places in the empire, it being allowed either to ſell, or buy, or make arms eſſentially. They were exempted from all offices and taxes, and received a ſalary from the public. When once they had taken the employment, neither they, nor their children, were allowed to quit it. To prevent this, they had a kind of mark impreſſed on the arm, whereby they might be known. If any of them fled, or ſecreted their arms, the reſt were obliged to anſwer for him; on account of which, the eſſects of ſuch as died without a legal heir went to the college.—There were 5 armamentaries, in the Eaſtern empire, placed near the frontiers, and 19 in the Weſtern.

(1.) **ARMOURY**. See **ARMORY**.

(2.) **ARMOURY**, in heraldry, the knowledge of coat-armours, as to their blazons, and various inſignia.

ARMOY, a ſmall town of Ireland, in the county of Antrim, 109 miles from Dublin.

ARMOZA, or **HARMOZIA**, a town in Carmania, at the mouth of the Anamis, which falls into

the Perſian gulf; called **ARMUZA**, by Ptolemy. From this the neighbouring iſland, and a ſmall kingdom, take the modern name of *Ormuz*. Long. 56. 17. E. Lat. 27. 20. N.

(1.) * **ARMPIT**. *n. ſ.* [from *arm* and *pit*] The hollow place under the ſhoulder.—The handles to theſe gouges are made ſo long, that the handle may reach under the *armpit* of the workman. *Moxon*.—Others hold their plate under the left *arm-pit*, the beſt ſituation for keeping it warm. *Swift*.

(2.) **ARM-PIT**. See **AXILLA**.

(J. 1.) * **ARMS**. *n. ſ.* *without the ſingular number*. [*arma*, Lat.] 1. Weapons of offence, or armour of defence.—

Thoſe *arms* which Mars before
Had given the vanquiſh'd, now the victor bore. *Pope.*

2. A ſtate of hoſtility.—

Sir Edward Courtney, and the haughty prelate,
With many more confed'rates, are in *arms*. *Shakeſpeare.*

3. War in general.—

Arms and the man I ſing. *Dryden.*
Him Paris follow'd to the dire alarms.
Both breathing ſlaughter, both reſolv'd in *arms*. *Pope.*

4. Action; the act of taking arms.—

Up roſe the victor angels, and to *arms*
The matin trumpet ſung. *Milton.*
The ſeas and rocks and ſkies rebound,
To *arms*, to *arms*, to *arms*! *Pope.*

5. The enſigns armorial of a family.

(2.) **ARMS** alſo are uſed figuratively for the profeſſion of a ſoldier. Thus we ſay, he was bred to *arms*.

(3.) **ARMS, ANCIENT**. Arms of ſtone, and even of braſs, appear to have been uſed before men made uſe of iron and ſteel. Joſephus aſſures us, that the patriarch Joſeph firſt taught the uſe of iron arms in Egypt, arming the troops of Pharaoh with a caſque and buckler. What contributed moſt to render the Romans maſters of the world, was, that having ſucceſſively warred againſt all nations, they conſtantly renounced their own methods, arms, &c. whenever they met with better. Thus Romulus, during his war with the Sabines, a bold and warlike nation, adopted their broad buckler in lieu of the ſmall Argian buckler, which he had uſed till that time. The principal arms of the ancient Britons were hatchets, ſcythes, lances, ſwords, and bucklers: the Saxons, &c. brought in the halbard, bow, arrows, arbalets, &c. By the ancient laws of England, every man was obliged to bear arms, except the judges and clergy. By act, 33. Hen. VIII. it was expreſſly enjoined on all perſons to be regularly inſtructed, even from their tender years, in the exerciſe of the arms then in uſe; viz. the long bow and arrows; and to be provided with a certain number of them. The ancient arms of our Scots Highlanders are, the broad ſword, target, poniard and *whinyar*, or *durk*.

(4.) **ARMS, ETYMOLOGY AND ORIGIN OF**. Nicod derives the word from the Latin phraſe *quod operiant armos*, becauſe they cover the ſhoulders or ſides; but Varro derives *arma*, *ab arceant*, *quod arceant hoſtes*. It is ſuppoſed artificial arms were of wood, and

ployed against beasts; and that Belus, the son of Nimrod, was the first that waged war: whence, according to some, came the appellation *bellum*. Diodorus Siculus takes Belus to be the same with Mars, who first trained soldiers up to battle.

(5.) ARMS, FIRE, are those charged with powder and ball: such are cannon, mortars, and other ordnance; muskets, carabines, pistols, and even bombs, granadoes, carrasses, &c. In the History of the Royal Academy for 1707, we have an account of some experiments made with fire-arms differently loaded, by M. Callini. Among other things he observes, that by loading the piece with a ball which is somewhat less than the calibre, and only laying a little gunpowder below the ball and a good deal above it, it will yield a vehement noise, but have no sensible effect or impulse on the ball.—This he takes to have been the whole secret of those people who pretended to sell the art of rendering one's self invulnerable, or shot-proof.

(6.) ARMS, OF PARADE, OR COURTESY, were those used in the ancient jousts and tournaments; which were commonly unshod lances, swords without edge or point, wooden swords, and even canes.

(7.) ARMS, PASS OF, was a kind of combat in use among the ancient cavaliers.

(8.) ARMS, STAND OF, signifies a musket, a bayonet, a sword, belt, and cartridge-box.

(II.) ARMS, in falconry, denote the legs of a hawk, from the thigh to the foot. See FALCONRY.

(III.) ARMS, in heraldry, or ARMORIES, are used for marks of dignity and honour, regularly composed of certain figures and colours, given or authorised by sovereigns, and borne in banners, shields, coats, &c. for the distinction of persons, families, and states; and passing by descent to posterity.—They are called *arms*, in regard they are borne principally on the buckler, cuirass, banners, and other apparatus of war. They are also called *coats of arms*, *coat armour*, &c. because anciently embroidered on fur coats, &c. See HERALDRY.—Some will have the name to have been first occasioned by the ancient knights, who in their jousts and tournaments, bore certain marks (which were frequently their mistresses's favours) in their armour, i. e. their helms or shield, to distinguish them from each other. Arms at present, follow the nature of titles, which being made hereditary, these also become so, being the several marks for distinguishing of families and kindreds, as names are of persons and individuals. They are distinguished by various epithets, such as,

I. ARMS, ASSUMPTIVE, are such as a man has a right to assume of himself, in virtue of some gallant action. As, if a man who is no gentleman of blood, nor has coat armour, takes a gentleman, lord, or prince, prisoner, in any lawful war; he becomes entitled to bear the shield of such prisoner, and enjoy it to him and his heirs. The foundation hereof is that principle in military law, that the dominion of things taken in lawful war passes to the conqueror.

2. ARMS, CANTING, are those wherein the figures bear an allusion to the name of the family. Such are those of the family of Prado in Spain,

whole field is a meadow. Most authors hold these the most noble and regular, as is shown by an infinity of instances produced by father Varenne and Menetrier.—They are much debased, when they come to partake of the *Rebus*.

3. ARMS, CHARGED, are such as retain their ancient integrity and value, with the addition of some new honourable charge or bearing, in consideration of some noble action.

4. ARMS, FALSE, OR IRREGULAR, are those wherein there is something contrary to the established rules of heraldry. As, when metal is put on metal, or colour on colour, &c. The laws of arms, with the cognizance of offences committed therein, belong, in Britain, to the earl marshal and college of arms.

5. ARMS, FULL, OR ENTIRE, are such as retain their primitive purity, integrity, or value; without any alterations, abatements, or the like.—It is a rule, that the simpler and less diversified the arms, the more noble and ancient they are. For this reason Gartias Ximenes, first king of Navarre, and his successors for several ages, bore only gules, without any figure at all. The arms of princes of the blood, of all younger sons, and junior families, are not pure and full; but distinguished and diminished by proper differences, &c.

6. ARMS OF ALLIANCE, are those which families or private persons join to their own, to denote the alliances which they have contracted by marriage.

7. ARMS OF COMMUNITY, are those of bishoprics, cities, universities, and other bodies corporate.

8. ARMS OF CONCESSION, or augmentation of honour, are either entire arms, or else one or more figures given by princes, as a reward for some extraordinary service.

9. ARMS OF DOMINION, are those which emperors, kings, and sovereign states bear; being annexed to the territories which they possess. Thus the three lions are the arms of England; the fleurs de lys those of France, &c.

10. ARMS OF FAMILY, OR PATERNAL ARMS, are such as belong to a particular family, and which no other person has a right to assume.

11. ARMS OF PATRONAGE, are those which governors of provinces, lords of manors, &c. add to their family arms, in token of their peculiar superiority and jurisdiction.

12. ARMS OF PRETENSION, are those of such kingdoms or territories to which a prince or lord has some claim, and which he adds to his own, though the kingdoms or territories be possessed by a foreign prince or other lord. Thus the kings of England have quartered the arms of France with their own, ever since the claim of Edward III. to that kingdom, in 1330.

13. ARMS OF SUCCESSION, are assumed by those who inherit estates, manors, &c. by will, entail, or donation, and which they either impale or quarter with their own arms.

14. ARMS, PARTED, COUPED, QUARTERED, &c. See PARTI, &c.

15. ARMS, POURSUIVANT, KING AT, &c. See POURSUIVANT, KING, &c.

(IV.) ARMS, in law, are extended to any thing which a man takes in his hand in his wrath, to

kill at, or strike another. By the common law, it is an offence for persons to go or ride armed with dangerous weapons; but gentlemen may wear common armour, according to their quality, &c. 3d Inst. The king may prohibit force of arms, and punish offenders according to law; and herein every subject is bound to be aiding. Stat. 7. Edw. I. None shall come with force and arms before the king's justices, nor ride armed in affray of the peace, on pain to forfeit their armour, and to suffer imprisonment, &c. 2 Ed. III. c. 3. The importation of arms and ammunition are prohibited by 1 Jac. II. c. 8. and by 1 W. and M. stat. 2. c. 1. Protestant subjects may have arms for their defence. So likewise arms, &c. shipped after prohibition, are forfeited, by 29 Geo. I. c. 16. sec. 2. Arms of offence in use among us at present are, the sword, pistol, musket, bayonet, pike, &c. There are several acts of parliament for disarming the Highlanders; see 1 Geo. I. c. 54. 11 Geo. I. c. 16. 19 Geo. II. c. 39. 21 Geo. II. c. 34. 26 Geo. I. c. 22. and 29.

(V.) ARMS, in natural history, denote the natural weapons, or parts of defence, of beasts: as claws, teeth, tusks of elephants, beaks of birds, &c.

* ARM'S END. *n. s.* A phrase taken from boxing, in which the weaker man may overcome the stronger, if he can keep him from closing.—Such one as can keep him at *arm's end*, need never wish for a better companion. *Sidney's Arcadia*.—For my sake be comfortable, hold death awhile at the *arm's end*. *Shakespeare*. In the same sense used *arm's length*.

ARMSIDE, a village in Westmoreland, near Little Langdale, on the borders of Cumberland.

ARMSTRONG, John, M. D. an eminent physician, poet, and miscellaneous writer, was born in Cusleton parish, Roxburghshire, where his father and brother were ministers; completed his education in the university of Edinburgh; where he took his degree in physic, Feb. 4 1732, with much reputation; and published his thesis, as the arms of that university require, *De tæbe purulenta*. 1735 he published a little humorous fugitive pamphlet in 8vo, entitled, "An Essay for abridging the Study of Physic; to which is added a dialogue betwixt Hygeia, Mercury, and Pluto, relating to the Practice of Physic, as it is managed by a certain illustrious Society. As also an Epistle from Usbek the Persian, to Joshua Ward Esq." This piece contains much drollery; in the dialogue, he has caught the very spirit of Lucian. In 1737 he published *A Synopsis of the History and Cure of the Venereal Diseases*, 8vo. This was soon followed by the *Oeconomy of Love*; a poem which has much merit, but it is too strongly tinged with the licentiousness of Ovid. It is said, that his maturer judgment expunged many of the extravagances of youthful fancy, in an edition "revised and corrected by the author" in 1768. It appears by one of the cases on literary property, that Mr Millar paid 50 guineas for the copy-right of this poem, which was intended as a burlesque on some dictatic writers. It has been observed of Dr Armstrong, that his works have great inequalities, some of them being possessed of every requisite of the most perfect composition, while others can hardly be considered as superior to the

productions of mediocrity. The *Art of Preserving Health*, his best performance, was published in 1744, and will transmit his name to posterity as one of the first of British writers. In 1746, Dr Armstrong was appointed one of the physicians to the hospital for lame and sick soldiers behind Buckingham house. In 1751, he published his poem on Benevolence, in folio; and in 1753, "Taste, an epistle to a young Critic. In 1758 appeared, "Sketches, or Essays on various subjects, by Launcelot Temple, Esq; in two parts." In this production, which possesses much humour and knowledge of the world, and which had a remarkably rapid sale, he is supposed to have been assisted by Mr Wilkes. In 1760 he was appointed physician to the army in Germany, where, in 1761, he wrote a poem called "Day, an Epistle to John Wilkes of Aylesbury Esq." In this poem, which is not collected with his works, he wantonly hazarded a reflection on Churchill, which drew upon him the serpent-toothed vengeance of that severest of satirists, whose embalming or corrosive pen could deify or lampoon any man, according as he acquiesced with, or dissented from, his political principles. In 1770, Dr Armstrong published a collection of "Miscellanies in 2 vols; containing, 1. The Art of preserving Health. 2. Of Benevolence, an Epistle to Eumenes. 3. Taste, an Epistle to a young Critic, 1753. 4. Imitations of Shakespeare and Spenser. 5. The Universal Almanac, by Nouredin Ali. 6. The Forced Marriage, a tragedy. 7. Sketches." In 1771, he published "A short ramble through some parts of France and Italy, by Launcelot Temple; and in 1773, in his own name, a 4to pamphlet, entitled, *Medical Essays*; towards the conclusion of which, he accounts for his not having such extensive practice as some of his brethren, from his not being qualified to employ the usual means, from a ticklish state of spirits, and a distempered excess of sensibility. He complains much of the behaviour of some of his brethren, of the herd of critics, and particularly of the reviewers. He died in Sept. 1779; and to the surprise of his friends, left more than L. 300 saved out of a very moderate income, arising principally from his half-pay.

ARMSWELL, a village in Dorsetshire, a mile from Plush.

ARMTREE, a small town in Lincolnshire, near Horn-Castle.

ARMUYDEN, a sea port town of Zealand, in the island of Valcherin, formerly very flourishing; but now inconsiderable, the sea having stopped up the harbour with sand. The salt works are its chief resource. It lies 3 miles E. of Middleburg, at the mouth of the canal. Long. 3. 42. E. Lat. 51. 31. N.

ARMUZA. See ARMORA.

(1.) * ARMY. *n. s.* [*armée*, Fr.] 1. A collection of armed men, obliged to obey one man. *Locke*.—Number itself importeth not much in *armies*, where the people are of weak courage. *Bacon*.—The meanest soldier, that has fought often in an *army*, has a truer knowledge of war, than he that has writ whole volumes, but never was in any battle. *South*.—

The Tuscan leaders, and their *army* sing,
Which follow'd great *Aneas* to the war;

Their

to defend, and means to defend it with whereas, among us, the lands and riches of a nation being shared among a few, the rest have no way of subsisting but by trades, arts, and like, and have neither any free property to defend, nor means to enable them to go to war in defence of it, without starving their families. A large part of our people are either artificers or servants, and thus only minister to the luxury and effeminacy of the great. While the equality of lands subsists,

cond. All the varieties in the fortunes of
two famous republics may very well be accounted
for from the same cause.

(8.) ARMY, STANDING, OF CARTHAGE. At the end of the first to the beginning of the second Punic war, the armies of Carthage were continually in the field, and employed by great generals, who succeeded one another in command, Hannibal, his son-in-law Asdrubal, his son Hannibal, first in choosing his own soldiers, afterwards in subduing the

nations of Africa, and, lastly, in conquering the great kingdom of Spain. The army which Hannibal led from Spain into Italy must necessarily, in those different wars, have been gradually formed to the exact discipline of a standing army. The Romans, in the mean time, though they had not been altogether at peace, yet they had not, during this period, been engaged in any war of very great consequence; and their military discipline, it is generally said, was a good deal relaxed. The Roman armies which Hannibal encountered at Trebia, Thrasymenus, and Cannæ, were militia opposed to a standing army. The circumstance, it is probable, contributed more than any other to determine the fate of those battles. The standing army which Hannibal left behind him in Spain, had the like superiority over the militia which the Romans sent to oppose it, and in a few years, under the command of the younger Asdrubal, expelled them almost entirely from that country. Hannibal was ill supplied from home. The Roman militia, being continually in the field, came in the progress of the war a well-disciplined and well-exercised standing army; and the inferiority of Hannibal grew every day less and less. Asdrubal judged it necessary to lead the whole, or almost the whole, of the standing army which he commanded in Spain, to the assistance of his brother in Italy. In this march he is said to have been misled by his guides; and in a country which he did not know, was surprised and attacked by another standing army, in every respect equal or superior to his own, and was entirely defeated. When Asdrubal had left Spain, the great Ascanio found nothing to oppose him but a militia inferior to his own. He conquered and subdued the militia; and in the course of the war, his own militia necessarily became a well-disciplined and well-exercised standing army. That standing army was afterwards carried to Africa, where it found nothing but a militia to oppose it. In order to defend Carthage it became necessary to recall the standing army of Hannibal. The disheartened and frequently defeated African militia joined it, and at the battle of Zama composed the greater part of the troops of Hannibal. The event of that day determined the fate of the two rival republics.

(9.) ARMY, STANDING, OF ROME, &c. From the end of the second Carthaginian war till the fall of the Roman republic, the armies of Rome were every respect standing armies. The standing army of Macedon, although far inferior, made some resistance to their arms. In the height of their grandeur, it cost them two great wars, and three great battles, to subdue that little kingdom; which the conquest would probably have been much more difficult, had it not been for the cowardice of its last king. The militias of all the civilized nations of the ancient world, of Greece, of Asia, and of Egypt, made but a feeble resistance to the standing armies of Rome. The militias of some of the barbarous nations defended themselves much better. The Scythian or Tartar militia, which Mithridates drew from the countries north of the Euxine and Caspian seas, were the most formidable enemies whom the Romans had to encounter after the second Carthaginian war.—The Parthian and German militias too were al-

ways respectable, and upon several occasions gained very considerable advantages over the Roman armies. In general, however, and when the Roman armies were well commanded, they appear to have been very much superior. Many different causes contributed to relax the discipline of the Roman armies. Its extreme severity was, perhaps, one of those causes. In the days of their grandeur, when no enemy appeared capable of opposing them, their heavy armour was laid aside as burdensome, their exercises were neglected as unnecessarily toilsome. Under the Roman emperors too, the standing armies of Rome, those particularly which guarded the German and Pannonian frontiers, became dangerous to their masters, against whom they used frequently to set up their own generals. In order to render them less formidable, according to some authors, Dioclesian, according to others Constantine, first withdrew them from the frontier, where they had always before been encamped in great bodies, generally of two or three legions each, and dispersed them in small bodies through the different provincial towns, from whence they were scarce ever removed, but when it became necessary to repel an invasion. Small bodies of soldiers quartered in trading and manufacturing towns, and seldom removed from those quarters, became themselves tradesmen, artificers, and manufacturers. The civil came to predominate over the military character; and the standing armies of Rome gradually degenerated into a corrupt, neglected, and undisciplined militia, incapable of resisting the attack of the German and Scythian militias, which soon afterwards invaded the western empire. It was only by hiring the militia of some of those nations to oppose to that of others, that the emperors were for some time able to defend themselves. The fall of the western empire is the third great revolution in the affairs of mankind, of which ancient history has preserved any distinct or circumstantial account. It was brought about by the irresistible superiority which the militia of a barbarous has over that of a civilized nation; which the militia of a nation of shepherds has over that of a nation of husbandmen, artificers, and manufactures. The victories which have been gained by militias have generally been not over standing armies, but over other militias in exercise and discipline inferior to themselves. Such were the victories which the Greek militia gained over that of the Persian empire; and such too were those which in later times the Swiss militia gained over that of the Austrians and Burgundians. The military force of the German and Scythian nations, who established themselves upon the ruins of the western empire, continued for some time to be of the same kind in their new settlements, as it had been in their original country.—It was a militia of shepherds and husbandmen, which in time of war took the field under the command of the same chieftains whom it was accustomed to obey in peace. It was therefore tolerably well exercised, and tolerably well disciplined. As arts and industry advanced, however, the authority of the chieftains gradually decayed, and the great body of the people had less time to spare for military exercises. Both the discipline and

and the exercise of the feudal militia; therefore, went to ruin, and standing armies were gradually introduced to supply the place of it. When the expedient of a standing army, had once been adopted by one civilized nation, it became necessary that all its neighbours should follow the example. They soon found that their safety depended upon their doing so, and that their own militia was altogether incapable of resisting the attack of such an army.

(10.) **ARMY, STANDING, SUPERIOR TO A MILITIA.** The soldiers of a standing army, though they may never have seen an enemy, yet have frequently appeared to possess all the courage of veteran troops, and the very moment that they took the field, to have been fit to face the hardiest and most experienced veterans. In a long peace, the generals perhaps may sometimes forget their skill; but where a well regulated standing army has been kept up, the soldiers seem never to forget their valour. When a civilized nation depends for its defence upon a militia, it is at all times exposed to be conquered by any barbarous nation which happens to be in its neighbourhood. The frequent conquests of all the civilized countries in Asia, by the Tartars, sufficiently demonstrates the natural superiority which the militia of a barbarous has over that of a civilized nation. A well regulated standing army is superior to every militia. Such an army, as it can best be maintained by an opulent and civilized nation, so it can alone defend such a nation against the invasion of a poor and barbarous neighbour. It is only by means of a standing army, therefore, that the civilization of any country can be perpetuated, or even preserved for any considerable time. As it is only by means of a well regulated standing army, that a civilized country can be defended, so it is only by means of it, that a barbarous country can be suddenly and tolerably civilized. A standing army establishes, with an irresistible force, the law of the sovereign through the remotest provinces of the empire, and maintains some degree of regular government in countries which could not otherwise admit of any. Whoever examines with attention, the improvements which Peter the Great introduced into the Russian empire, will find, that they almost all resolve themselves into the establishment of a well regulated standing army. It is the instrument which executes and maintains all his other regulations.— That degree of order and internal peace, which that empire has ever since enjoyed, is altogether owing to the influence of that army.

(11.) **ARMY, STANDING, UNFAVOURABLE TO LIBERTY, BUT SOMETIMES FRIENDLY TO IT.**— Men of republican principles are jealous of a standing army as dangerous to liberty. It certainly is so, wherever the interest of the general officers are not necessarily connected with the support of the constitution of the state. The standing army of Cæsar destroyed the Roman republic; the standing army of Cromwell turned the long parliament out of doors. But where the sovereign is himself the general, and the principal nobility and gentry of the country the chief officers of the army; where the military force is placed under the command of those who have the

greatest interest in the support of the civil authority, because they have themselves the great share of that authority; a standing army can never be dangerous to liberty: on the contrary, it may in some cases be favourable to liberty. The security which it gives to the sovereign renders unnecessary that troublesome jealousy, which in some modern republics seems to watch over the minutest actions, and to be at all times ready to disturb the peace of every citizen. Where the security of the magistrate, though supported by the principal people of the country, is endangered by every popular discontent; where a small tumult is capable of bringing about, in a few hours, a great revolution; the whole authority of government must be employed to suppress and punish every complaint against it. To a sovereign, on the contrary, who feels himself supported, not only by the natural aristocracy of the country, but by a well regulated standing army, the rudest, the most groundless, and the most licentious remonstrances, can give little disturbance. He can safely pardon or neglect them, and his consciousness of his own superiority naturally disposes him to do so. That degree of liberty which approaches to licentiousness can be tolerated only in countries where the sovereign is secured by a well regulated standing army. It is in such countries only, that the public safety does not require, that the sovereign should be trusted with any discretionary power, for suppressing even the impetuous wantonness of this licentious liberty.

ARM, YARD. See **YARD ARM.**

ARMY LANDS, in geography, sundry districts in the United States of America, lying on the east of the Ohio, and to the westward of Pennsylvania, situated between 80° and 91° Long. W. and 37° and 41° Lat. N.

ARNA, or **ARNI,** a sea port of Andros. See **ANDROS**, No I. § 3.

ARNABOS, in the materia medica, an aromatic drug, described by Paulus Ægineta, and other Greek physicians; and supposed to be the same with the **ZARNAB** of Avicenna, the **CARPESIA** of the more ancient Greek writers. This was a drug much used as an aromatic and cordial, and allowed in many cases to be a good substitute for cinnamon. It was the young shoots of the cypripedium tree.

ARNALDIA, or **ARNOLDIA,** in physic, a febrile malignant kind of disease, frequent formerly in England; the most distinguishing symptom whereof was a falling off of the hair. Authors are much at a loss for the nature of this disease, which appears to have been peculiar to our country. From the description given of it in an ancient chronicle, Mollerus concludes it to have been a species of the venereal disease, as that distemper appeared in those days in this country.

ARNALL, William, a noted political writer in defence of Sir Robert Walpole, was originally an attorney's clerk; but being recommended to Walpole, he employed him for a course of years in writing the *Free Briton*, and other papers in defence of his administration. By the report of the secret committee, he appears to have received in the space of four years, no less a sum than £. 10,997 : 6 : 8 out of the treasury for his services.

things! but spending his money as fast as it came, and his supplies stopping on Sir Robert's resignation, he died broken hearted and in debt, in the 26th year of his age. His invention was so quick, that his employer used to say, no man in England could write a pamphlet in so little time as Arnall.

(1.) ARNAUD, D'ANDILLY, Anthony, the son of a celebrated advocate of the parliament of Paris, and a doctor of the Sorbonne, was born in 1612. He published, in 1643, *A Treatise on frequent Communion*, which highly displeased the Jesuits; and the disputes upon grace, which broke out about this time in the university of Paris, and in which he took a zealous part with the Jansenists, helped to increase the animosity. But nothing raised so great a clamour against him, as the two letters he wrote on *Absolution*; in the second of which the faculty of divinity found two propositions which they condemned, and M. Arnaud was expelled the society. Upon this he retired; and during a retreat which lasted near 25 years, composed that great variety of works which are extant, on grammar, geometry, logic, metaphysics, and theology. In 1679, he withdrew from France, lived in obscurity in the Netherlands, and died in 1694. His heart, at his own request, was sent to be deposited in the Port Royal. Arnaud had a remarkable strength of genius, memory, and command of his pen; nor did these decay, even to the last year of his life. Mr Bayle says, that he was a man very simple in his manners; and, that unless any one proposed some question to him, or desired some information, he did nothing that might make one take him for a man of great abilities; but, when he set himself to give an answer to such as proposed a point of reasoning, he seemed as it were transformed into another man: he would then deliver a multitude of fine things with great perspicuity, and had a singular talent at making himself intelligible to persons of not the greatest penetration.

(2.) ARNAUD, D'ANDILLY, Robert, elder brother of Anthony, (No 1.) was born in 1588; and, being introduced young at court, was employed in many considerable offices, all which he discharged with great integrity and reputation. In 1644 he quitted business, and retired into the convent Port Royal des Champs, where he passed the remainder of his days in a continued application to works of piety and devotion; and enriched the French language with many excellent translations of different writers, as well as with religious compositions of his own. He died in 1674, and his works are printed in 8 vols. folio.

(3.) ARNAUD, DE MEYRUEILH, or MEKEVIL, a poet of Provence, who lived at the beginning of the 13th century. He wrote a book intitled *recaptemas de sa comtesse*, and a collection of poems and sonnets. He died in 1220. Petrarch mentions him in his *Triumph of Love*.

(4.) ARNAUD, DE VILLANOVA, a famous physician, who lived about the end of the 13th and beginning of the 14th century. He studied at Padua and Montpellier, and travelled through Italy and Spain. He was well acquainted with languages, and particularly with the Greek, Hebrew, and Arabic. He was at great pains to gratify his ardent thirst after knowledge; but this passion carried

him too far in his researches: he endeavoured to discover future events by astrology, imagining this science to be infallible; and upon this foundation he published a prediction, that the world would come to an end in the middle of the 14th century! He practised physic at Paris for some time; but having advanced some new doctrines, he drew upon himself the resentment of the university; and his friends fearing he might be arrested, persuaded him to retire from that city. Upon his leaving France, he retired to Sicily, where he was received by Frederick king of Arragon with the greatest marks of kindness and esteem. Some time afterwards, this prince sent him to France, to attend Pope Clement in an illness; and he was shipwrecked on the coast of Genoa, about the year 1313. The works of Arnaud, with his life prefixed, were printed in one volume folio, at Lyons, in 1520—and at Basil in 1585, with the notes of Nicholas Tolerna.

ARNAUT LAROS. See ALBANIA, No. 2.

ARNAUTS, cavalry belonging to the Grand Seigneur.

ARNAY-LE-DUC, a town of France, in the department of Cote d'Or, which carries on a pretty good trade. It is seated in a valley near the river Arroux, 25 miles N. W. of Baune. Long. 46. E. Lat. 47. 7. N.

ARNCLIFF, two villages of Yorkshire, viz. 1. in the N. Riding, near Wharton-Castle: 2. in the W. Riding, on a river, E. of Pennygent hill.

ARNCOT, a small town in Oxfordshire, near Amersden and Bicester.

ARNDAL, a small town, but a large landing place of Christiansand, in Norway, seated on a rock in the middle of the river Nid. It has several iron mines near it.

ARNDT, John, a famous Protestant divine of Germany, born at Ballenstedt, in the duchy of Anhalt, in 1555. At first he applied to the study of physic; but falling into a dangerous sickness, he made a vow to change his profession for that of divinity, if he should be restored to health; which he accordingly did upon his recovery. He was minister first at Quedlinburg and then at Brunswick. He met with great opposition in this last city: his success as a preacher raised the enmity of his brethren. They ascribed a variety of errors to him; and persecuted him to such a degree, that he was obliged to leave Brunswick, and retire to Illeb, where he was minister for 3 years. In 1611, George Duke of Lunenburg, who had a high opinion of his integrity and sanctity, gave him the church of Zell, and appointed him superintendant of all the churches in the duchy of Lunenburg; which office he discharged for 11 years, and died in 1621. It is reported that he foretold his death, and said to his wife, upon his return home after his last sermon, that he had now preached his funeral sermon. He wrote in High Dutch, *A treatise on true Christianity*, which has been translated into several languages.

ARNE, Dr Thomas Augustine, distinguished by his skill in music, was the son of Mr Arne, an upholsterer in Covent Garden, whom Addison is supposed to have characterised in No. 155 and No. 160 of *The Tatler*; and brother of Mrs Cibber the player. He was early devoted to music, and

soon became eminent in his profession. In July 6, 1759, he had the degree of doctor of music conferred on him at Oxford. His compositions are universally applauded, and he was also particularly skillful in instructing vocal performers. He died March 5, 1778, having written the following operas: *Artaxerxes*, in 1762; *The Guardian outwitted*, 1764, and *The Rose*, in 1778.

ARNEBERG, a town of Brandenburg, seated on the Elbe, between Angermund and Werben, 3 miles distant from each. It was taken from the Swedes in 1631, and is now subject to Prussia.

ARNEDO, a town in S. America, in Peru, with a good harbour, 25 miles N. of Lima.

ARNEFONT, a village of Angus-shire, in the parish of Glamis, which has about 80 inhabitants.

ARNEHEIM. See ARNHEIM.

ARNESBY, a village in Leicestershire, near Sleafby.

ARNESIDE, a village in Lancashire, on the borders of Cumberland.

ARNESIDE-FEWER, a village in Lancashire, on the borders of Westmoreland.

ARNGASK, a parish of Scotland, situated in, or rather comprehending a part of, 3 different counties, which meet in it, viz. Fifeshire on the E. Perthshire on the W. and N. W. and Kinross-shire on the S. It contained in 1790, by Mr Lang's report to Sir John Sinclair, 123 houses and 554 inhabitants, which is 182 fewer than it contained in 1755. The soil is various, and the climate salubrious.

ARNGILL, a village in Westmoreland, on the Lune.

ARNHALE, a small town in Warwickshire.

ARNHALL, a district of Mearns-shire, in the parish of Fettercairn.

ARNHEIM, or ARNEHEIM, a town of the United Provinces, in Guelderland, capital of Veluwe, seated on the Rhine, 8 miles N. of Nimeguen, and 32 E. by S. of Utrecht. It is adorned with several fine churches, particularly that of St Walburg and of St Eusebius; which last has a very high tower. The town has five gates, and several fine ramparts, part of which are washed by the Rhine, and the other parts have wide and deep ditches before them. There is a canal between this place and Nimeguen, made at the expence of both towns, on which boats pass backwards and forwards to carry on a trade between them. The air is very healthful. Long. 5. 55. E. Lat. 52. 0. N.

ARNHUSEN, a small town of Pomerania near the Riga, 4 leagues from Colberg and the Baltic.

ARNI. See ARNA.

ARNICA, LEOPARDS BANE, in botany, a genus of the polygamia superflua, order, belonging to the syngenesia class of plants; and in the natural method ranking under the 49th order, *Compositæ-discoides*. The receptacle is naked; the pappus is simple; and the filaments are five, without antheræ. There are 7 species all natives, of Ethiopia, except the two following:

1. ARNICA MONTANA, with oval leaves, grows naturally on the Alps, and also upon many of the high mountains in Germany, and other cold parts of Europe. The roots of this species, when planted

in a proper soil and situation, spread very far under the surface, and put out many entire oval leaves, from between which the flower-stems arise, which grow about a foot and an half high. The top is terminated by a single yellow flower, composed of many florets, like those of the dandelion. These are succeeded by oblong seeds, which are covered with down. This plant delights in a moist shady situation, and may be propagated by parting the roots, in autumn when the stalks begin to decay; or by the seeds sown in autumn soon after they are ripe, for those sown in spring often fail. It has an acrid bitter taste, and when bruised, emits a pungent odour, which excites sneezing. On this account the country people in some parts of Germany use it as snuff, and smoke it like tobacco. It was formerly recommended as a remedy of great efficacy against effusions and suffusions of blood, from falls, bruises, or the like; and it was then also mentioned as a remedy in jaundice, gout, nephritis, &c. but in these affections it is now very little, if at all, employed. Of late it has been principally recommended in catalytic affections, and in cases where a loss or diminution of sense arises from an affection of the nerves, as in instances of amaurosis. In these it has chiefly been employed under the form of infusion. From a dram to half an ounce of the flower has been directed to be infused in a pint of boiling water, and taken in different doses in the course of the day: sometimes it produces vomiting, sometimes sweating, sometimes diarrhoea; but frequently its use is attended with no sensible operation, unless it can be considered as such, as in some cases of paralysis, the cure is said to be preceded by a peculiar prickling, and by shooting pains in the affected parts. It has also been lately represented as a very powerful antispasmodic, and to have been successfully employed in several particularly those of the intermittent kind, and in cases of gangrene. In those diseases it has been said to prove as efficacious as the Peruvian bark, the form of a pretty strong decoction taken in small doses frequently repeated, or in that of an electuary with honey. Its real influence however remains to be determined by future observation; but it is one of those active substances from which something may be expected.

2. ARNICA SCORPIOIDES, with sawed leaves growing alternately, is a native of Bohemia and Siberia. The roots of this sort are much jointed and divided into many irregular fleshy offsets, which are variously contorted; from whence superstitious persons have imagined that they would expel the poison of scorpions, and cure the wounds made by the sting of that animal. This species is propagated like the other. Both are very hardy and require no other care than to be kept from weeds.

ARNIFORD, LOCH, a harbour of Scotland, in the parish of Duirnish, in the Isle of Skye.

ARNIS, an island of Sleswick.

ARNISÆUS, Henningus, a philosopher and physician of great reputation, about the beginning of the 17th century. He was born at Halberstadt in Germany, and was professor of physics in the university of Helmstadt. The most remarkable of his works are, 1. *De autoritate principum*.

semper inviolabili, in which he maintains that the authority of princes ought not to be violated; 2. *De jure majestatis libri tres*, and *Reflectiones politicae*, all printed at Francfort, in 1610, 1612, and 1615. He was invited to Denmark, and was made counsellor and physician to the king. He travelled into France and England, and died in November 1615. He wrote also several philosophical, medicinal, and political treatises.

ARNISTON, the seat and property of Robert Dundas, Esq. Lord Advocate, is situated 10 miles S. S. E. from Edinburgh, in the parish of Temple and county of Mid Lothian, near the E. banks of the S. Esk.

(1.) ARNO, a large and rapid river of Italy, in Tuscany, which it divides, and in its course washes Florence and Pisa; rising in the Appennines, to the east of Florence, near a village called *S. Maria della Gratie*, on the borders of Romagna, 15 miles to the west of the sources of the Tiber; and then running southward towards Arretium, it is there detained by the lakes of the Clanis; after which it runs westward, dividing Florence into two parts, and at length washing Pisa, falls 8 miles below it into the Tuscan Sea.

(2.) ARNO, a pleasant valley of Italy, through which the ARNO (No. 1.) runs, and which abounds with all kinds of fruits. Part of it is thought to have been formerly a lake, before the Arno made its passage through the rock at Rignano. The bones of elephants are found in digging, through its strata, which are very regular.

ARNOBIUS, professor of rhetoric at Sicca, in Numidia, towards the end of the 3d century. Being bred up a Pagan, he at first opposed Christianity: but in consequence of certain dreams, he became desirous of embracing it. For this purpose he applied to the bishops to be admitted into the church. But they had some distrust of him, and before they would admit him, insisted on some proofs of his sincerity. In compliance with this demand, he wrote against the Gentiles; wherein he refuted the absurdities of their religion, and denounced their false gods. In this treatise he has employed all the flowers of rhetoric, and displayed great learning; but from an impatience to be admitted into the body of the faithful, he is thought to have been in too great a hurry in composing his work, and not having exact knowledge of the Christian faith, he published some very dangerous errors. Mr Bayle remarks, that his notions about the original of the soul, and the cause of natural evil, and several other important points, are highly pernicious. St Jerom, in his epistle to Paulinus, is of opinion that his style is unequal and too diffuse, and that his book is written without method; but Dr Cave thinks this judgment too severe, and that Arnobius wants neither elegance nor order in his composition. Vossius styles him *the Varro of ecclesiastical writers*. Du Pin observes, that his work is written in a manner worthy of a professor of rhetoric: the turn of his sentiments is very oratorical; but his style is a little African, his expressions being harsh and inelegant. We have several editions of his work against the Gentiles; one published at Rome in 1542, others at Basil, Paris, and Antwerp; and one at Hamburg in 1610, with notes by Gerhard Elmenhorstius. He wrote

also a piece intitled *De rectorica institutione*; which is not extant.

ARNODI, in antiquity, [from *arnos*, a lamb, which was their usual reward, and *adon*, song, or singing,] the RHAPSODI, or public singers in Greece.

(I. 1.) ARNOLD, a native of Brescia, in Italy, distinguished himself by being the founder of a sect which opposed the wealth and power of the Romish clergy. He went into France, where he studied under the celebrated Peter Abelard. Upon his return to Italy, he put on the habit of a monk, and opened his invectives in the streets of Brescia. The people crowded round him. He told them he was sent to reform abuses, to pull down the proud and to exalt the humble. He then pointed out his declamation against the bishops, against the clergy, against the monks, and finally against the Roman pontiff himself; to the laity only he was indulgent. "Churchmen, said he, who hold benefices, bishops who have domains, and monks that have possessions, will all be damned." His hearers shouted approbation. "These things, continued he, belong to the prince; he may give them to whom he pleases, but he must give them to the laity. It is on their tithes, and the voluntary contributions of the people, that those sons of God must live: they must be frugal, continent, and mortified."—The church of Brescia was soon thrown into the greatest confusion, and the people, already prejudiced against their ministers, threatened to overturn their altars. The sacred writings he urged in support of his assertions, and from them he denounced the vengeance of Heaven against the violators of the law. Indeed, nothing could be more glaringly offensive than the ostentatious parade of the bishops and great abbots, and the soft and licentious lives of the monks and clergy. A grand council was held at Rome, in 1139; Arnold was cited to appear before it. His accusers were the bishop of Brescia, and many others, whom he had ridiculed and insulted. From such judges he could not look for much indulgence. He was found guilty, and sentenced to perpetual silence. Upon this he left Italy, crossed the Alps, and found a refuge in Zurich. Though Arnold had quitted Italy, yet had his opinions taken deep root, and Rome itself was infected by them. Irritated by the conduct of their master Innocent II. the Roman people assembled in the Capitol. It was proposed that the power of the pontiff, which they called exorbitant, should be restrained: this was carried: when suddenly, inspired as it were by the genius of the place, they moved that the senate, which for years had been abolished, should be restored. The proposition was received with the loudest acclamations. Innocent in vain opposed the bold design; there was a magic in it which spread irresistibly, and for a moment seemed to rouse the fallen spirit of the nation. The pope viewed with horror the reverse of fortune which threatened the tiara; to be shorn of his mighty power, and to become the mere shepherd of the Christian people, was a thought too afflicting; he fell sick and died. Under his successors Celestine and Lucius, whose reigns were but of a few months, the Romans pursued their darling object.

They waited on the latter, and, in an imperious tone, demanded the restitution of all the honours and civil rights which had been usurped from the people. The prince of the senate, said they, whom we have chosen, will best administer the important trust: the tithes and offerings of the faithful will sufficiently answer all the exigencies of your holiness: it was thus that our ancient bishops lived.—Lucius survived this event but a few days. His successor was Eugenius III. the friend and disciple of the renowned Bernard. The night before his consecration the senators assembled, and it was agreed, that either he should solemnly confirm all their proceedings, or they would annul his election. This resolution was notified to him. He called together his friends; and it was their advice, that he should neither accede to their extravagant demand, nor expose himself, by a refusal, to the fury of the populace. He therefore silently withdrew from Rome, and retired to a neighbouring fortress. Arnold, who, in banishment, had contemplated the effect of his admonitions on the minds of the Romans, and the success which seemed to follow their exertions, was now informed that the pope had retired, and that the gates of the capitol were open to receive him: it was likewise suggested to him, that his presence was more than ever necessary, to give energy to their resolves, form to their plans, and stability to their undertakings. Arnold took fire at the news; an unusual swell of enthusiasm filled his breast; and he fancied that, like Junius Brutus, he was called at once to give liberty to Rome. At his appearance a new stream of vigour animated the citizens; they called him their friend and deliverer. The Brescian walked amongst them; his deportment was humble, his countenance emaciated, his address affable, and he spoke to them of moderation, of submission, of obedience. With the nobles and new senators also he was mild and diffident, speaking much of virtue and of respect for religion and the laws. But no sooner was he sensible of his own real influence, and saw the lengths to which the revolvers had carried their designs, than he harangued the people; he talked of their forefathers the ancient Romans, who, by the wisdom of the senate and the valour of their armies, had conquered nations and subdued the earth: He dwelt on the names and the achievements of the Bruti, the Gracchi, and the Scipios; and of these men, said he, are you not the children? He advised, that the capitol be instantly repaired; that the equestrian order be restored; that the people have their tribunes; that dignity attend the senate; and that the laws, which had been silent and neglected, be revived in all their vigour. He spoke of the pope as of a deposed and banished tyrant. “But should you again be disposed (continued he) to admit him within these walls; fix your own rights and determine his. He is but your bishop: let him therefore have his spiritual jurisdiction. The government of Rome, its civil establishments, and its territories belong to you. These you will keep if you have the spirit of men and the hearts of Romans.” Fired by this harangue, the people, headed by the most disaffected nobles, attacked the few cardinals and churchmen who remained in the city; set fire to the palaces; and com-

pelled the citizens to swear obedience to the new government. Moderate men were shocked at these excesses, but it was in vain to oppose the torrent: they submitted, looking forward, with some curiosity, to the termination of an event which had begun in extravagance, and could not but end in disappointment. Eugenius till now viewed, with concern, the wild derangement of the people: but when it seemed that their eyes were opened to their own excesses, he could be inactive no longer. He excommunicated the ringleaders of the faction; and at the head of his troops, marched against the enemy. His friends within the city, who were numerous co-operated with his designs, and in a few days overtures for peace were made to the pontiff. He acceded to them, but on condition that they should annul the arrangements they had made, and if they would have senators, that they should acknowledge all their power was from him. The people were satisfied, and they threw open the gates, through which Eugenius entered, among the acclamations of a fawning and inconstant multitude.—Before this event Arnold had retired; but he left behind him many friends strongly attached to his person and principles. Of himself we hear little more till the reign of Adrian our countryman; when, on account of fresh tumults, he and his adherents were excommunicated, and Rome was threatened with an interdict unless they expelled the whole party from their walls. This they did. The Arnoldists retired with their champion into Tuscany, where he was received as a prophet and honoured as a saint. His enemies, however, prevailed: he was made prisoner, and conducted under a strong escort to Rome. In vain was great interest made to save his life; he was condemned to the stake, and executed, and his ashes thrown into the Tiber, lest the people should collect his remains and venerate them as the relics of a sainted martyr.

(2.) ARNOLD, CHARACTER OF. Mr Bevington, in his lives of Abelard and Heloise, describes Arnold, as “a man whose character, whose principles, and whose views, we perhaps should be disposed to admire, had his life been recorded by unprejudiced historians, and not brought down to us drawn in the blackest colours which party, bigotted zeal, and enthusiasm, could lay on. He was rash, misjudging, and intemperate, else he never would have engaged in so unequal a contest.—The view of such a phenomenon in the 12th century excites a pleasing admiration. To attack the Roman pontiff and his clergy in the very centre of their power, required a more than common share of fortitude; to adopt a settled scheme of restoring to its pristine glory the republic of Rome, demanded a stretch of thought-comprehensive and enterprising; and to forego the ease and indulgence of a dissipated age, for the reformation of manners and the suppression of what he thought usurped dominion, argued a character of mind disinterested, generous, and benevolent. But Arnold, like other reformers, went too far; and passion soon vitiated undertakings which were begun perhaps with motives the most laudable.—The readiness with which the Roman people embraced this plan of lowering the jurisdiction of the pontiff,

just, and restraining it within those bounds which the true spirit of Christianity had fixed, at once shows that they could reason justly, and that they considered the unbounded sway of the triple crown, to which reluctantly they submitted, as an assumed prerogative, to which violence or misinstruction, and not Christian right, had given efficacy."

(II.) **ARNOLD**, in geography, a village near Nottingham, on the E. side of Beshwood Park.

ARNOLDIA. See **ARNALDIA**.

ARNOLDISTS, in church history, a sect so called from their leader. See **ARNOLD**, N° 1. § 2.

ARNOLDS, a village in Essex, near Chelmsford.

ARNOLDUS, Gottfriedus, pastor and inspector of the churches of Perleberg, and historiographer to the king of Prussia, was born at Annaburg in the mountains of Misnia in 1666. He was a zealous defender of the Pietists, a sect among German Protestants, and composed a great number of religious works; particularly an *Eccelesiastical History*, which exposed him to the resentment of the divines; and another giving an account of the doctrines and manners from the times, in which he frequently animadverts upon Cave's primitive Christianity. He died in 1714. Various are the opinions concerning Arnoldus in Germany; some of his own countrymen and others extolling him to the skies as a saint of the last century, and setting an inestimable value on his works; while others pronounce damnation upon him as an arch-heretic, and condemn his writings as heterodox.

ARNON, in ancient geography, a river that rises in the mountains of Gilead and runs S. W. between the borders of the Moabites and Ammonites on the other side Jordan. Josephus says it rises on the borders of Arabia, and falls into the Red Sea. It is also called the river of Gad, as appears from 2 Sam. xxiv. 5. compared with 2 Kings 1. 33.

(I.) **ARNOT**, a small river in Perthshire, which flows through Glenfermat, and waters the district of Athardale in the parish of Moulin.

(II.) **ARNOT**. See **ARNOTTA**, N° 1.

(III.) **ARNOT**, in botany, the English name of bunium. See **BUNUM**.

(IV.) **ARNOTTA**, or **ARNOT**, in botany, a name given by the peasants of Burgundy, and many other places, to certain roots which they frequently turn up, from five or six inches depth, showing the ground. They carefully collect them, and eat them, after roasting in the ashes, or otherwise; by which sort of cooking they acquire the taste of a chestnut, and are found to be very wholesome and nourishing food. They are blackish on the outside, and white within, and are of the size of a small walnut. They are common in the north of Scotland.

(V.) **ARNOTTA**, } the same with Anotta.

ARNOTTO, } See **ANOTTA** and **BIXA**.

ARNOULD, St., a town of France, in the department of Eure and Loire, in the forest of Ivelin on the road from Chartres to Paris.

ARNSHEIM, a town of Germany, in the palatinate of the Rhine, 8 miles from Crutzenach.

ARNSTADE, or } a town of Germany, in
ARNSTADT, } Thuringia, on the river
Gera, 10 miles S. W. of Enfort. Long. 12. 5. 10.
Lat. 40. 54. N.

ARNULPH, or **ERNULPH**, bishop of Rochester, in the reign of Henry I. He was born in France, where he was some time a monk of the monastery of Lucian de Beauvais. The monks led most regular lives in this monastery; for which reason he resolved to quit it; but first took the advice of Lanfranc archbishop of Canterbury, who invited him over to England, and placed him in the monastery of Canterbury, where he lived a private monk till Lanfranc's death. When Anselm succeeded, Arnulph was made prior of the monastery of Canterbury, and afterwards abbot of Peterborough. In 1115, he was consecrated bishop of Rochester, which see he held nine years, and died in 1124, aged 84. He wrote, 1. A piece in Latin, entitled *Textus Roffensis*, concerning the foundation, endowment, charters, laws, &c. of the church of Rochester: it is preserved in the archives of that church. 2. An Epistle, in answer to some Questions of Lambert, abbot of Munster; and, 3. An Epistle on incestuous Marriage.

ARNULPHIN, or } a coin of the value of a
ARNULPHINUS, } ducat and a half, current
in some parts of France in the 15th century.

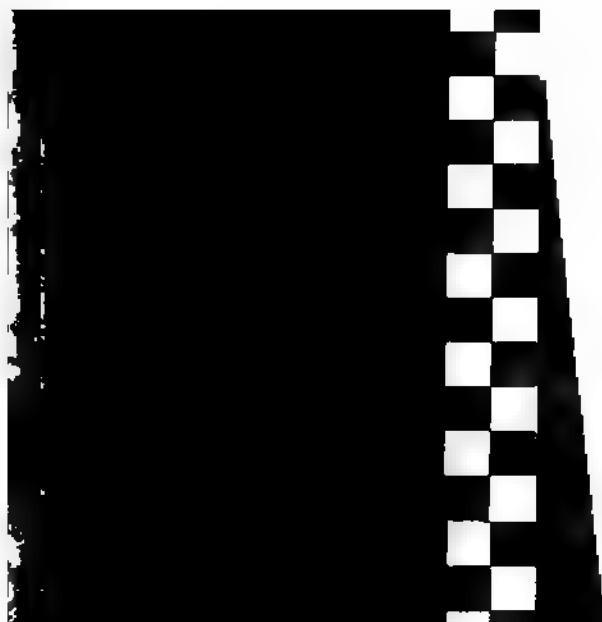
ARNUS, the ancient name of Arno. See **ARNO**, No 1.

ARNWAY, John, a clergyman distinguished by his benevolence and loyalty to king Charles I. was descended from a good family in the county of Salop, from which he inherited a considerable estate. He was educated at Oxford; and, having received holy orders, obtained the rectories of Hodnet and Ightfield, where he distinguished himself by his piety and exemplary charity: for it was his custom to clothe annually, 11 poor people, and every Sunday to entertain as many at his table, not only plentifully, but with intimacy and respect. The civil war breaking out, he preached against rebellion, and raised and clothed eight troopers for the service of king Charles I. upon which his house was plundered by the parliament's army. He then went to Oxford, to serve the king in person, which subjected him to a new train of misfortunes: for his estate was soon after sequestered, and himself imprisoned till the king's death; after which, he went to the Hague, where he published, 1. The Tablet, or the Moderation of Charles I. the Martyr; and, 2. An Alarm to the Subjects of England. He at last went to Virginia, where he died in 1653.

ARNWOOD, a village in Hampshire, near Christ Church.

AROBALIATCHI, a river of N. America, which rises in the country of the Chicafaw Indians, to the W. of Georgia, and after running S. and being joined by the Yazoo and other rivulets, falls into the Mississippi.

AROBAS, or } by some spelt and pronounced
AROBES, } **ARROBE**; in Spanish, **ARROBAS**; in the language of Peru, **ARROU**: a weight used in Spain, Portugal, Goa, Brazil, and in all Spanish America. All these arobes are scarcely like each other but in name, being very different in



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or, as anciently the judgment ran, *till he answered*. It hath been doubted whether this punishment subsisted at the common law, or was introduced in consequence of the statute Westm. 1. 3 Edw. I. c. 12. which seems to be the better opinion. For not a word of it is mentioned in Glanvil or Bracton, or in any ancient author, case or record (that hath yet been produced), previous to the reign of Edward I. but there are instances on record in the reign of Henry III. where persons accused of felony, and standing mute, were tried in a particular manner, by two successive juries, and convicted; and it is asserted by the judges in 8 Henry V. that, by the common law before the statute, standing mute on an appeal amounted to a conviction of the felony. This statute of Edward I. directs such persons, "as will not put themselves upon inquests of felonies before the judges at the suit of the king, to be put into hard and strong prison (*soient mys en la prison fort et dure*), as those which refuse to be at the common law of the land." And, immediately after this statute, the form of the judgment appears in Fleta and Britton to have been only a very strait confinement in prison, with hardly any degree of sustenance; but no weight is directed to be laid upon the body, so as to hasten the death of the miserable sufferer: and indeed any surcharge of punishment on persons adjudged to penance, so as to shorten their lives, is reckoned by Horne in the 12th century as a species of criminal homicide. It also early appears, by a record of 31st Edw. III. that the prisoner might then possibly subsist for 40 days under this lingering punishment. It is therefore imagined that the practice of loading him with weights, or, as it is usually called, *pressing him to death*, was gradually introduced between Edward III. and 8 Henry IV. at which last period it first appears upon the books; being intended as a species of mercy to the delinquent, by deterring him the sooner from his torment: and as it is also probable, that the duration of the penance was then first altered; and instead of continuing *till he answered*, it was directed to continue *till he died*, which must very soon happen under an enormous pressure. The uncertainty of the original, the doubts that were conceived of its validity, and the repugnance of its theory (for it is rarely carried into practice) to the humanity of the laws of England, all concurred to require a relative abolition of this cruel process, and a restitution of the ancient common law; whereby the standing mute in felony, as well as in treason and in trespass, amounted to the confession of the charge. II. If the prisoner made a simple and unqualified confession, the court hath nothing to do but to award judgment: but it is usually very backward in receiving and recording such confession, out of tenderness to the life of the subject; and will generally advise the prisoner to retract it, and to plead to the indictment; as to which, see the article PLEA OF INDICTMENT.

ARRAITORES. See ARRAY and ARRAYERS.
(I. I.) ARRAN, a mountainous island of Scotland, in the Frith of Clyde, between Kintyre and Cunningham; 23 miles in length and 12 in breadth, according to Walker. But Mr Gerthom Stewart, minister of Kilbride in Arran, in the Statistical Vol. II. PART II.

Account of his parish, states the breadth of the island at only seven miles. If he means Scots miles, the estimates are nearly equal. The best description of this island is the following (§ 2, 3, and 4.) given by Mr Pennant, in his Tour, Vol. II.

(2.) ARRAN, ANCIENT HISTORY OF. "Arran, or properly *Arr-inn*, or 'the island of mountains,' seems not to have been noticed by the ancients; notwithstanding it must have been known to the Romans, whose navy, from the time of Agricola, had its station in the *Gloia Æstuarium*, or the Frith of Clyde. Camden indeed makes this island the GLOTA of Antonine, but no such name occurs in his Itinerary: it therefore was bestowed on Arran by some of his commentators. By the immense cairns, the vast monumental stones, and many relics of Druidism, this island must have been considerable in very ancient times. Here are still traditions of the hero FINGAL, or Fin-mac-coul, who is supposed here to have enjoyed the pleasures of the chase; and many places retain his name: but I can discover nothing but oral history that relates to the island till the time of Magnus the Barefooted, the Norwegian victor, who probably included Arran in his conquest of Kintyre. If he did not conquer that island, it was certainly included among those that Donald Bane was to cede; for it appears that Acho, one of the successors of Magnus, in 1263, laid claim to Arran, Bute, and the Cunnrays, in consequence of that promise: the two first he subdued, but the defeat he met with at Largs soon obliged him to give up his conquests. Arran was the property of the crown. Robert Bruce retired thither during his distresses, and met with protection from his faithful vassals. Numbers of them followed his fortunes; and after the battle of Bannockburn he rewarded several, such as the Mac-cooks, Mac-kinnons, Mac-brides, and Mac-louis, or Fullertons, with different charters of lands in their native country. All these are now absorbed by this great family, except the Fullertons, and a Stewart, descended from a son of Robert III. who gave him a settlement here. In the time of the Dean of the Isles, his descendant possessed Castle Douan; and *he and his bluid*, says the Dean, *are the best men in that country*. About the year 1334, this island appears to have formed part of the estate of Robert Stewart, great steward of Scotland, afterwards Robert II. At that time they took arms to support the cause of their master; who afterwards, in reward, not only granted at their request an immunity from their annual tribute of corn, but added several new privileges, and a donative to all the inhabitants that were present. In 1456, the whole island was ravaged by Donald Earl of Ross and Lord of the Isles. At that period, it was still the property of James II. but in the reign of his successor James III. when that monarch matched his sister to Thomas Lord Boyd, he created him Earl of Arran, and gave him the island as a portion. Soon after, on the disgrace of that family, he caused the Countess to be divorced from her unfortunate husband; and bestowed both the lady and island on Sir James Hamilton, in whose family it continues to this time, a very few farms excepted."

(3.) ARRAN, EXTENT, ANIMALS, CLIMATE, &c.

&c. OF. "Arran is of great extent, being 23 miles from Sgreddan point north to Beinnean south; and the number of inhabitants are about 7000, who chiefly inhabit the coasts; the far greater part of the country being uninhabited by reason of the vast and barren mountains. Here are only two parishes, Kilbride and Killmore; with a sort of chapel of ease to each, founded in the last century, in the golden age of this island, when it was blessed with Anne Duchess of Hamilton, whose amiable disposition and humane attention to the welfare of Arran render at this distant time her memory dear to every inhabitant. The principal mountains of Arran are, Goatfield, or Gaoilbheim, or "the mountain of the winds," of a height equal to most of the Scottish Alps, composed of immense piles of moor-stone, in form of wool-packs, clothed only with lichens and mosses, inhabited by eagles and ptarmigans; Beinbharrain, or "the sharp pointed;" Ceum-na-caillich, "the step of the carline or old hag;" and Grianan-Athol, that yields to none in ruggedness. The lakes are, Loch-jorsa, where salmon come to spawn; Loch-tana; Loch-nah-jura, on the top of a high hill; Loch-mhachrai; and Loch-knoc-a-charbeil, full of large eels. The chief rivers are, Abhan-mhor, Moina-mhor, Slondrai-machrei, and Jorsa; the two last remarkable for the abundance of salmon. The quadrupeds are very few; only otters, wild-cats, shrew-mice, rabbits, and bats: the stags, which used to abound, are now reduced to about a dozen. The birds are, eagles, hooded-crows, wild pigeons, staves, black game, grouse, ptarmigans, daws, green plovers, and curlews. It may be remarked that the partridge at present inhabits this island, a proof of the advancement of agriculture. The climate is very severe: for besides the violence of wind, the cold is very rigorous; and snow lay here in the valleys for 13 weeks of the last winter. In summer, the air is remarkably salubrious; and many invalids resort here on that account, and to drink the whey of goats milk. The principal disease here is the pleurisy: small-pox, measles, and chincough, visit the island once in seven or eight years. The practice of bleeding twice every year seems to have been intended as a preventative against the pleurisy: but it is now performed with the utmost regularity at spring and fall. The duke of Hamilton keeps a surgeon in pay; who at those seasons makes a tour of the island. On notice of his approach, the inhabitants of each farm assemble in the open air; extend their arms; and are bled into a hole made in the ground, the common receptacle of the vital fluid. In burning fevers, a tea of *wood sorrel* is used with success, to allay the heat. An infusion of *ramsons*, or *allium ursinum*, in brandy, is esteemed here a good remedy for the gravel."

(4.) **ARRAN, INHABITANTS, AGRICULTURE, &c. OF.** "The men are strong, tall, and well made; all speak the Erse language, but the ancient habit is entirely laid aside. Their diet is chiefly potatoes and meal; and during winter, some dried mutton or goat is added to their hard fare. A deep dejection appears in general through the countenance of all: no time can be spared for amusement of any kind; the whole being given for procuring the means of paying their rent, of

laying in their fuel, or getting a scanty pittance of meat and clothing. The leases of farms are 19 years. The succeeding tenants generally find the ground little better than a *caput mortuum*: and for this reason; should they at the expiration of the lease leave the lands in a good state, some avaricious neighbours would have the preference in the next setting, by offering a price more than the person who had expended part of his substance in enriching the farm could possibly do. This induces them to leave it in the original state. The method of setting a farm is very singular; each is commonly possessed by a number of small tenants; thus a farm of 40 l. a-year is occupied by 18 different people, who by their leases are bound, conjointly and severally, for the payment of the rent to the proprietor. These live in the farm in houses clustered together, so that each farm appears like a little village. The tenants annually divide the arable land by lot; each has his ridge of land, to which he puts his mark, such as he would do to any writing: and this species of farm is called *run-rig*, i. e. ridge. They join in ploughing; every one keeps a horse or more; and the number of those animals consume so much corn as often to occasion a scarcity; the corn and peas raised being (much of it) designed for their subsistence, and that of the cattle, during the long winter. The pasture and moor land annexed to the farm is common to all the possessors. All the farms are open. Inclosure of any form, except in two or three places, are quite unknown: so that there must be a great loss of time in preserving the corn, &c. from trespass. The usual manure is sea plants, coral and shells. The *run-rig* farms are now discouraged: but since the tenements are set by roup or auction, and advanced by an unnatural force to above double the old rent, without any allowance for inclosing, any example set in agriculture, any security of tenure by lengthening the leases, affairs will turn retrograde, and the farms relapse into their old state of rudeness; migration will increase (for it has begun), and the rents be reduced even below their former value: the late rents were scarce 1200 l. a-year; the expected rents 3000 l.

(5.) **ARRAN, LIVE STOCK, PRODUCE, &c. OF.** "The live stock of the island is 3183 milch cows, 2000 cattle, from one to three years old; 1500 horses; 1500 sheep; and 500 goats: many of the two last are killed at Michaelmas, and dried for winter provision, or sold at Greenock. The cattle are sold from 40 to 50 s. per head, which brings into the island about 1200 l. per annum: I think that the sale of horses also brings in about 300 l. Hogs were introduced here only two years ago. The herring-fishery round the island brings in 300 l. the sale of herring-nets 100 l. and that of thread about 300 l. for a good deal of flax is raised here. These are the exports of the island; but the money that goes out for the necessities is a melancholy drawback. The produce of the island is oats; of which about 5000 bolls, each equivalent to 9 Winchester bushels, are sown; 500 of beans, a few peas, and above 1000 bolls of potatoes, are annually set: notwithstanding this, 500 bolls of oat-meal are annually imported, to subsid the natives. The women manufacture the wool for the clothing."

batting of their families; they set the potatoes, and dress and spin flax. They make butter for exportation, and cheese for their own use. The inhabitants in general are sober, religious and industrious; great part of the summer is employed in getting peat for fuel, the only kind in use here; in building or repairing their houses, for the want of the materials requires annual repairs: before and after harvest, they are busied in the drying-fishery; and during winter the men make their herring-nets; while the women are employed in spinning their linen and woollen yarn. The light they often use is that of lamps. From the beginning of February to the end of May, if the weather permit, they are engaged in labouring their ground: in autumn they burn a great quantity of fern, to make kelp. So that, excepting at New-year's-day, at marriages, or at the two or three fairs in that island, they have no leisure for any amusements: no wonder then at their depression of spirits. Arran forms part of the county of Dumbarton, and is subject to the same sort of government: but, besides, justice is administered at the town's baily court, who has power to fine as high as 20 s. can decide in matters of property not exceeding 40 s. can imprison for a month; and put delinquents into the stocks for three hours, but only during day-time."

(6.) ARRAN, POPULATION OF. From the Statistical reports of Messrs Stewart and Hamilton, ministers of Kilbride and Kilmory, to Sir John Macleod, it appears that the population of both these parishes has increased greatly within these 40 years; and that, in 1793, the number of souls in the whole island amounted to 5804, and the total increase within that period to 2158. See KILBRIDE and KILMORY.

(II.) ARRAN, a town of Switzerland, seated on the Aar, 25 miles S. W. of Baden. The Diets of the Protestant Cantons are held in it.

(III.) ARRAN, a village in the E. Riding of Yorkshire, near Lund.

(IV.) ARRAN, NORTH, an island of Ireland, situated on the coast of Donegal in Ulster. Long. 10. 0. W. Lat. 55. 0. N.

(V.) ARRAN, SOUTH ISLES OF, three islands on the W. coast of Ireland, in the mouth of Galway Bay. Long. 10. 0. W. Lat. 55. 0. N.

TO ARRANGE. *v. a.* [arranger, F.] To put in the proper order for any purpose.—

I chanc'd this day

To see two knights in travel on my way,
(A sorry sight!) *arrang'd* in battle new. *F. Queen.*
How effectually are its muscular fibres *arranged*, and with what judgment are its columns and sinews disposed! *Cheyne.*

(1.) * ARRANGEMENT. *n. s.* [from *arrange*.] The act of putting in proper order; the state of being put in order.—There is a proper *arrangement* of the parts in elastick bodies, which may be illustrated by use. *Cheyne.*

(2.) ARRANGEMENT, in philosophy. The experiments of modern philosophers have put it past doubt that the diversity of the colours of bodies depends entirely on the situation and arrangement of the parts, which reflect the light differently; the diversity of tastes and smells on the coherent arrangements of the pores, which render them

differently sensible; and the general diversity of bodies on the different arrangement of their parts.

(3.) ARRANGEMENT, in rhetoric, has great effect. The happy arrangement of words makes one of the greatest beauties of discourse. See ORATORY.

* ARRANT. *adj.* [a word of uncertain etymology, but probably from *errant*, which being at first applied to its proper signification to vagabonds, as an *errant* or *arrant* rogue, that is, a *rambling* rogue, lost, in time, its original signification, and being by its use understood to imply something bad, was applied at large to any thing that was mentioned with hatred or contempt.] Bad in a high degree.—Country folks, who hallooed and hooted after me, as at the *arrantest* coward that ever shewed his shoulders to the enemy. *Sidney.*—A vain fool grows forty times an *arranter* sot than before. *L'Estrange*—

And let him every deity adore,

If his new bride prove not an *arrant* whore.

Dryden.

* ARRANTLY. *adv.* [from *arrant*.] Corruptly; shamefully.—Funeral tears are as *arrantly* hired out as mourning clothes. *L'Estrange.*

(1.) ARRAS, a city of France, in the department of the Straits of Calais; formerly the capital of the ci devant province of Artois. It is seated on a mountain; and the parts about it are full of quarries, where good stones are got for building. It is divided into two parts by a strong wall, a large fosse, and the rivulet Chrinchron, which, 100 paces below, falls into the Scarp. They are both well fortified, inclosed by high ramparts and deep fosses, which in several places are cut out of the rock. Arras has 4 gates, and a strong citadel with 5 bastions. The most remarkable places are, the great square where the principal market is kept, full of fine buildings, with piazzas all round it; the lesser market, which contains the town-house, a very noble structure, with a high tower covered with a crown, on the top of which is a brazen lion which serves for a vane. In the midst of this market is the chapel of the Holy Candle, which the papists pretend was brought by the Virgin Mary herself above 600 years ago, when the city was afflicted with divers diseases, and every one that touched the candle was cured! The candle is kept in a silver shrine. This chapel has a steeple, adorned with several statues. The cathedral church of Notre-Dame stands in the city. It is a very large Gothic building, extremely well adorned; the tower is very high, and has a fine clock embellished with little figures in bronze, which represent our Saviour's passion, and pass before the bell to strike the hours. In this church there is (or at least there *was* before the revolution) a silver shrine, enriched with pearls and diamonds, containing a sort of wool, called *manna*; which, it was pretended, fell from heaven in the time of a great drought, 1400 years ago! The abbey church of St Vedast is the greatest ornament of Arras, being adorned with a fine steeple, and seats of admirable workmanship; the pulpit is of brass, fashioned like a tree, supported by two bears of the same metal, sitting on their hind legs; there are little bears in different postures, seemingly ready to climb up the tree. The chimes are

remarkable for the different tunes they play. There are 10 parish churches. Arras is situated 32 miles S. W. of Doway. Long. 2. 50. E. Lat. 50. 20. N.

(2.) ARRAS, or ARAXES, a river of Persia, in Georgia, which rises in Georgia, and running S. E. joins the Cyrus, and the united streams fall into the Caspian Sea between Shirvan and Aderbeizan. See ARAXES.

(3.) * ARRAS. *n. f.* [from *Arras*, a town in Artois, where hangings are woven.] Tapestry; hangings woven with images.—

Thence to the hall, which was on every side
With rich array and costly arras dight. *F. Queen.*

He's going to his mother's closet;
Behind the arras I'll convey myself,
To hear the process. *Shakespeare.*

As he shall pass the galleries, I'll place
A guard behind the arras. *Denham's Sophy.*

* ARRAUGHT. *v. a.* [a word used by *Spenser* in the preter tense, of which I have not found the present, but suppose he derived *arreach* from *ar-racher*, Fr.] Seized by violence.—

His ambitious sons unto them twain
Arraught the rule, and from their father drew. *Fairy Queen.*

* ARRAY. *n. f.* [*arroy*, Fr. *arreo*, Sp. *arredo*, Ital. from *rege*, Teut. order. It was adopted into the middle Latin, *mille hominum arratorum*, Knighton.] 1. Order, chiefly of war.—The earl espying them scattered near the army, sent one to command them to their array. *Hayward.*—

Wer't thou sought to deeds,
That might require th' array of war, thy skill
Of conduct would be such, that all the world
Could not sustain thy prowess. *Milton.*

A gen'ral sets his army in array
In vain, unless he fight and win the day. *Denb.*
Dress.—

A rich throne, as bright as sunny day,
On which there sat most brave embellished
With royal robes, and gorgeous array,
A maiden queen. *Fairy Queen.*

In this remembrance, Emily ere day
Arose and dress'd herself in rich array. *Dryd.*

3. In law, *Array*, of the Fr. *array*, i. e. *ordo*, the ranking or setting forth of a jury or inquest of men impannelled upon a cause. Thence is the verb to *array* a pannel, that is, to set forth one by another the men impannelled. *Cowel.*

* To ARRAY. *v. a.* [*arroyer*, old Fr.] 1. To put in order. 2. To deck; to dress; to adorn the person: with the particle *with*, or *in*.—Deck thyself now with majesty and excellency, and *array* thyself *with* glory and beauty. *Job*, xl. 10.—

Now went forth the morn,
Such as in highest heav'n, array'd in gold
Empyrean. *Milton.*

One vest array'd the corpse, and one they
spread
O'er his clos'd eyes, and wrapp'd around his
head. *Dryden.*

3. In law. See ARRAY in law.

ARRAY, BATTLE. See ARRAY, and ARMY, § 2.

* ARRAYERS. *n. f.* [from *array*.] Officers who anciently had the care of seeing the soldiers duly appointed in their armour. *Cowel.*

(1.) * ARREAR. *adv.* [*arriere*, Fr. behind.]

Behind. This is the primitive signification of the word, which, though not now in use, seems to be retained by *Spenser*. See REAR.—

To leave with speed Atlanta swift *arrear*,
Through forests wild and unfrequented land,
To chase the lion, boar, or rugged bear.

(2.) * ARREAR. *n. f.* That which remains behind unpaid though due. See ARREARAGE.

His boon is giv'n; his knight has gain'd the
day,
But lost the prize; th' *arrears* are yet to pay.

—If a tenant run away in *arrear* of some rent, the land remains; that cannot be carried away, or lost. *Locke*. It will comfort our grand children, when they see a few rags hung up in Westminster-hall, which cost an hundred millions, whereof they are paying the *arrears*, and boasting, as began to do, that their grandfathers were rich. *Swift*.

* ARREARAGE. *n. f.* a word now little used, [from *arriere*, Fr. behind.] *Arrearage* is the remainder of an account, or a sum of money remaining in the hands of an accountant; or, more generally, any money unpaid at the due time, as *arrearage* of rent. *Cowel*.—Paget set forth the king's of England's title to his debts and profits from the French king; with all *arrearages*. *Hayward*.—

He'll grant the tribute, send th' *arrearages*.

—The old *arrearages* under which that crown had long groaned, being defrayed, he hath brought Lurana to uphold and maintain herself. *Honour's Vocal Forest*.

* ARREARANCE. *n. f.* The same with *arrears*. See ARREAR. D.

ARREARS. See ARREAR and ARREARAGE. ARRECTATUS, in law, accused of a crime. To ARBED, *v. a.* to award. *Milton*.

ARRENATUS, in law, arraigned.

* ARRENTATION. *n. f.* [from *arrend*, Span. to farm.] Is, in the forests law, the letting an owner of lands in the forest, to inclose them with a low hedge and small ditch, in consideration of a yearly rent. *Diell*.

* ARREPTITIOUS. *adj.* [*arreptus*, Lat.] 1. Snatched away. 2. [from *ar* and *repto*.] Capt in privily.

ARRERAGIUM, arrears. See ARREAR. N. 2.

(I. 1.) * ARREST. *n. f.* [from *arrest*, Fr. stop.] 1. In law. A stop or stay; as, a man apprehended for debt, is said to be arrested. To plead in *arrest* of judgment, is to shew cause why judgment should be stayed, though the verdict of the twelve be passed. To plead in *arrest* of taking the inquest upon the former issue, is to shew cause why an inquest should not be taken. An *arrest* is a certain restraint of a man's person, depriving him of his own will, and binding it to become obedient to the will of the law, and may be called the beginning of imprisonment. *Cowel*.—If I could speak so wisely under an *arrest*, I would send for my creditors; yet I had as lief have the foppery of freedom, as the mortality of imprisonment. *Shakespeare*. 2. Any caption, seizure of the person.—To the rich man, who promised himself ease for many years, it was a sad *arrest*, that

his soul was surpris'd the first night. *Taylor.* 3. A stop.—The stop and *arrest* of the air sheweth, that the air hath little appetite of ascending. *Bac.*

(1.) ARREST, in English law, is either used in civil or criminal cases.

1. *An ARREST, IN A CIVIL CAUSE,* is defined to be the apprehending or restraining one's person by process in execution of the command of some court. An arrest must be by corporal seizing or touching the defender's body; after which the plaintiff may justify breaking open the house in which he is, to take him: otherwise he has no such power; but must watch his opportunity to arrest him. For every man's house is looked upon by the law to be his castle of defence and asylum, wherein he should suffer no violence. Which principle is carried so far in the civil law, that, for the most part, not so much as a common citation or summons, much less an arrest, can be executed upon a man within his own walls. Peers of the realm, members of parliament, and corporations, are privileged from arrests; and of course from outlawries. And against them the process to enforce an appearance must be by summons and distress *infinite*, instead of a *capias*. Also clerks, attorneys, and all other persons attending the courts of justice (for attorneys being officers of the court, are always supposed to be there attending,) are not liable to be arrested by the ordinary process of the court, but must be sued by bill (called usually a *bill of privilege*) as being personally present in court. Clergymen performing divine service, and others merely staying in the church with a fraudulent design, are for the time privileged from arrests, by statute 30 Edw. III. c. 5. and 1 Rich. II. c. 16.; likewise members of convocation actually attending thereon, by statute 8 Hen. VI. c. 1. Suitors, witnesses, and other persons, necessarily attending any courts of record upon business, are not to be arrested during their actual attendance, which includes the necessary coming and returning. Seamen in the king's service are privileged from arrests for debts under L. 20. (1 Geo. II. c. 14. and 1 Geo. II. c. 38.;) and soldiers or marines are not liable to arrests for a debt of less than L. 10. (1 Geo. II. c. 6, 11.) And no arrest can be made in the king's presence, nor within the verge of his royal palace, nor in any place where the king's justices are actually sitting. The king hath moreover a special prerogative (which indeed is very seldom exerted,) that he may by his *writ of prohibition* privilege a defendant from all personal, and many real suits, for one year at a time, and no longer; in respect of his being engaged in his service out of the realm. And the king also by the common law might take his credit into his protection, so that no one might sue or arrest him till the king's debt was paid; but by the statute 25 Edw. III. c. 19. notwithstanding such protection, no other creditor may proceed to judgment against him, with a stay of execution, till the king's debt be paid; unless such creditor will undertake for the king's debt, and then he shall have execution for both. And, lastly, by statute 29 Car. II. c. 1. no arrest can be made, nor process served, upon Sunday, except for treason, felony, or breach of the peace.

2. *An ARREST, IN A CRIMINAL CAUSE,* is the

apprehending or restraining one's person, in order to be forthcoming to answer an alleged crime. To this arrest all persons whatsoever are, without distinction, equally liable; and doors may be broken open to arrest the offender; but no man is to be arrested, unless charged with such a crime as will at least justify holding him to bail when taken. There is this difference also between arrests in civil and criminal cases, that none shall be arrested for debt, trespass, or other cause of action, but by virtue of a precept or commandment out of some court; but for treason, felony, or breach of the peace, any man may arrest with or without warrant or precept. But the king cannot command any one by word of mouth to be arrested; for he must do it by writ, or order of his courts, according to law: nor may the king arrest any man for suspicion of treason, or felony, as his subjects may; because, if he doth wrong, the party cannot have an action against him. Arrests by private persons are in some cases commanded. Persons present at the committing of a felony must use their endeavours to apprehend the offender, under penalty of fine and imprisonment; and they are also, with the utmost diligence, to pursue and endeavour to take all those who shall be guilty thereof out of their view, upon a hue and cry levied against them. By the vagrant act 17 Geo. II. c. 5. every person may apprehend beggars and vagrants; and every private person is bound to assist an officer requiring him to apprehend a felon. In some cases likewise arrests by private persons are rewarded by law. By the 4th and 5th, William and Mary, c. 8. persons apprehending highwaymen, and prosecuting them to a conviction, are intitled to a reward of L. 40, and if they are killed in the attempt, their executors, &c. are intitled to the like reward. By the 6 and 7 William III. c. 17. persons apprehending counterfeiters and clippers of the coin, and prosecuting them to conviction, are intitled to L. 40. By 5 Ann, c. 31. persons who shall take one guilty of burglary, or the felonious breaking and entering any house in the day time, and prosecute them to conviction, shall receive the sum of L. 40 within one month after such conviction. Arrests, by public officers, as watchmen, constables, &c. are either made by their own authority, which differs but very little from the power of a private person; or they are made by a warrant from a justice of peace. See WARRANT.

(3.) ARREST OF JUDGMENT, in law, the assigning just reason why judgment should not pass: as, Want of notice of the trial; a material defect in the pleading; when the record differs from the deed impleaded; when persons are misnamed, where more is given by the verdict than is laid in the declaration, &c. This may be done either in criminal or civil causes.

(II.) * ARREST. *n. s.* [in horsemanship.] A mangy humour between the ham and pastern of the hinder legs of a horse. *Dist.*

* To ARREST. *v. a.* [arrestor, Fr. to stop.] 1. To seize by a mandate from a court or officer of justice. See ARREST.—

Good tidings, my lord Hastings, for the which

I do

¶ *To arrest thee, traitor, of high treason.*

Shakespeare.

—There's one yonder *arrested*, and carried to prison, was worth five thousand of you all. *Shakespeare.*

2. To seize any thing by law.—He hath enjoyed nothing of Ford's but twenty pounds of money, which must be paid to Mr Brook; his horses are *arrested* for it. 3. To seize; to lay hands on; to detain by power.—

But when as Morpheus had with leaden maze

Arrested all that goodly company. *Fairy Queen.*

—Age itself, which, of all things in the world, will not be baffled or defied, shall begin to *arrest*, seize, and remind us of our mortality. 4. To withhold; To hinder.—This defect of the English justice was the main impediment that did *arrest* and stop the course of the conquest. *Davies.*—

As often as my dogs with better speed

Arrest her flight, is she to death decreed. *Dryden.*

Nor could her virtues, nor repeated vows

Of thousand lovers, the relentless hand

Of death *arrest*.

Philips.

5. To stop motion.—To manifest the coagulative power, we have *arrested* the fluidity of new milk, and turned it into a curdled substance. *Boyle.* 6.

To obstruct; to stop.—Ascribing the causes of things to secret proprieties, hath *arrested* and laid asleep all true enquiry. *Bacon.*

ARRESTANDIS BONIS *ne dissipentur*, a writ which lies for him whose cattle or goods are taken by another, who, during the controversy is likely to make away with them, and will hardly be able to give satisfaction for them afterwards.

ARRESTANDO IPSUM, *qui pecuniam recepit ad proficiscendum in obsequium regis*, &c. is a writ which lies for the apprehension of him that hath taken bounty money to serve in the king's wars, and hides himself when he should go.

ARRESTMENT; in Scots law, signifies the securing of a criminal till trial; or till he find caution to stand, in what are called *ballable crimes*. In civil cases, it signifies either the detaining of strangers or natives *in meditatione fugæ*, till they find caution *judicio fisci*, or the attaching the effects of a stranger in order to found jurisdiction. But in the most general acceptation of the word, it denotes that diligence by which a creditor detains the goods or effects of his debtor in the hands of third parties till the debt due to him be either paid or secured. See **LAW, INDEX.**

ARRESTO FACTO SUPER BONIS, &c. a writ brought by a denizen against the goods of aliens found within this kingdom, as a recompence for goods taken from him in a foreign country.

ARRET, a decree; the decision of a sovereign court. *Bailey.*

* **ARRETED**. *adj.* [*arrestatus*, low Lat.] He that is convened before a judge, and charged with a crime.—It is used sometimes for *imputed* or *laid unto*; as, no folly may be *arreted* to one under age. *Coowell.*

ARRETIVM, or **ARRHETIVM**, one of the 12 ancient towns of Tuscany, near the Arnis and Clanis, situated in a pleasant valley; now called Arezzo, 42 miles east of Florence. See **AREZZO.**

(1.) **ARRETS**, in horsemanship. See **ARREST**, No. II.

(2.) **ARRETS**, or **ARRETES**, [*Arètes*, Fr.] in ichthyology, the back bones of fishes.

ARRHABONARII, [from *arhabon*, earnest,] a sect of Christians, who held that the eucharist is neither the real flesh or blood of Christ, nor yet the sign of them; but only the pledge or earnest thereof.

ARRHÆ, or **ARGENTUM DEI**. See **ARGENTUM DEI**, and **EARNEST**, &c.

ARRHAPHON, a skull without sutures, found to be the cause of incurable cephalalgia.

ARRHENOGOGON, in botany, a name given by some to the *parietaria*, or pellitory of the wall.

ARRHEPHORIA, a feast among the ancient Athenians, instituted in honour of Minerva, and Herse daughter of Cecrops. The word was composed of *arphos*, mystery, and *phero*, I carry; on account of certain mysterious things which were carried in procession at this solemnity.—Boys, or, as some say, girls, between 7 and 12 years of age, were the ministers that assisted at this feast, and were denominated *arphoroi*. This feast was also called *Hersephoria*, from Herse already mentioned.

ARRHETINI, the inhabitants of Arrhetium.

ARRHETIVM. See **ARRETIVM**.

ARRIA, the virtuous and heroic wife of Pætus, who being condemned to death unjustly, along with her husband, by the tyrant Nero, first stabbed herself, and then gave the dagger to her husband, saying, "Pætus, it is not painful."

ARRIAGI, in the materia medica, a name given by some authors, particularly by Serapion and Avicenna, to a fine kind of camphor.

ARRIAN, a famous philosopher and historian under Adrian and the two Antonines, was born at Nicomedia in Bithynia. His great learning and eloquence procured him the title of *The second Xenophon*; and raised him to the consularship and most considerable dignities at Rome. His 4 books of *Dissertations upon Epictetus*, whose scholar he had been; and his *History of Alexander the Great*, 7 books, are admired by the best judges.

* **To ARRIDE**. *v. a.* [*arrideo*, Lat.] 1. To laugh at. 2. To smile; to look pleasantly upon one.

(1.) **ARRIEGE**, a department of France, bounded on the W. and N. by that of Upper Garonne, on the E. by Aude, and on the S. by the Pyrenees. It is so named from the river. See No. 2.

(2.) **ARRIEGE**, a river of France, which runs among the Pyrenees, runs through the department (No. 1), and passing by Foix and Pamiers falls into the Garonne, near Toulouse. Gold dust has been found amongst its sands.

(1.) * **ARRIERE**. *n. s.* [French.] The last body of an army, for which we now use *rear*.—The horsemen might issue forth without disturbance of the foot, and the avant-guard without shuffling with the battail or *arriere*.

(2.) * **ARRIERE BAN**. *n. s.* [*Casseneuve* derives this word from *arriere* and *ban*; *ban* denotes the convening of the noblesse or vassals, who hold fees immediately of the crown; and *arriere*, those who only hold of the king immediately.] A general proclamation, by which the king of France summons to the war all that hold of him, both his

own vassals or the noblesse, and the vassals of his vassals.

(1.) * **ARRIERE FEE**, or **FIEF**, is a fee dependant on a superior one. These fees commenced when dukes and counts, rendering their governments hereditary, distributed to their officers parts of the domains, and permitted those officers to gratify the soldiers under them, in the same manner.

(4.) **ARRIERE GUARD**. See **REAR-GUARD**.

(5.) * **ARRIERE VASSAL**. The vassal of a vassal. *Trevoux.*

ARRINGTON, a village, 9 miles from Cambridge, seated on the Cam, over which it has a bridge, towards Wendy.

* **ARRISION**. *n. f.* [*arriso*, Lat.] A smiling union. *DiB.*

* **ARRIVAL**. *n. f.* [from *arrive*.] The act of coming to any place; and, figuratively, the attainment of any purpose.—

How are we changed, since we first saw the queen?

She, like the Sun, does still the same appear,
Bright as she was at her arrival here. *Waller.*
—The unravelling is the arrival of Ulysses upon his own island. *Brown's View of Epic Poetry.*

* **ARRIVANCE**. *n. f.* [from *arrive*.] Company coming: not in use.—

Every minute is expectancy

Of more arrivance. *Shakespeare.*

* **To ARRIVE**. *v. n.* [*arriver*, Fr. To come on shore.] 1. To come to any place by water.—

At length arriving on the banks of Nile,
Wearied with length of ways, and worn with toil,

She laid her down. *Dryden.*

To reach any place by travelling.—When we were arrived upon the verge of his estate, we stopped at a little inn, to rest ourselves and our wives. *Sidney.* 3. To reach any point.—The hands of all body we have no difficulty to arrive;

but when the mind is there, it finds nothing to hinder its progress. *Locke.* 4. To gain any thing, by progressive approach.—It is the highest wisdom by despising the world to arrive at heaven; they are blessed who converse with God. *Taylor.*

The virtuous may know in speculation, what they could never arrive at by practice, and avoid the snares of the crafty. *Addison.* 5. The thing which we arrive is always supposed to be good.

To happen: with *to* before the person. This seems not proper.—

Happy! *to* whom this glorious death arrives.

More to be valued than a thousand lives. *Waller.*

ARRO, a river in Herefordshire, which runs to the Lug, near Leominster.

ARROBAS, or **ARROBE**. See **AROBAS**.

* **To ARRODE**. *v. a.* [*arrodo*, Lat.] To gnaw nibble. *DiB.*

ARROE, a small island of Denmark, in the Baltic Sea, a little S. of the island of Funen, and S. of that of Dulcen. It is 8 miles in length, and about 2 in breadth; and produces corn, anniseed, black cattle, and horses. It has 3 parishes, the most considerable of which is Koping. It stands on the S. side of the island, in the bottom of a bay,

and has a port with some trade. Long. 10. 20. E. Lat. 55. 10. N.

* **ARROGANCE**. } *n. f.* [*arrogantia*, Lat.]

* **ARROGANCY**. } The act or quality of taking much upon one's self; that species of pride which consists in exorbitant claims.—

Stanley, notwithstanding she's your wife,
And loves not me; be you, good lord, assur'd,
I hate not you for her proud arrogance. *Shakespeare.*

Pride hath no other glass

To shew itself but pride; for supple knees

Feed arrogance, and are the proud man's fees.

Shakespeare.

—Pride and arrogance, and the evil way, and the froward mouth do I hate. *Prov. viii. 13.*—Discouraging of matters dubious, and on any controvertible truths, we cannot, without arrogancy, entreat a credulity. *Brown's Vulgar Errors.*—Humility it expresses by the stooping and bending of the head; arrogance, when it is lifted, or, as we say, tossed up. *Dryden's Dufresnoy.*

* **ARROGANT**. [*adj. arrogans*, Lat.] Given to make exorbitant claims; haughty; proud.—Feagh's right unto that country which he claims, or the signiory therein, must be vain and arrogant. *Spenser on Ireland.*—An arrogant way of treating with other princes and states, is natural to popular governments. *Temple.*

* **ARROGANTLY**. *adv.* [from *arrogant*.] In an arrogant manner.—

Our poet may

Himself admire the fortune of his play;

And arrogantly, as his fellows do,

Think he writes well, because he pleases you.

Dryden.

Another, warmed

With high ambition, and conceit of prowess

Inherent, arrogantly thus presum'd;

What if this sword, full often drench'd in blood,

Should now cleave sheer the execrable head

Of Churchill.

Philips.

* **ARROGANTNESS**. *n. f.* [from *arrogant*.] The same with *arrogance*; which see. *DiB.*

* **To ARROGATE**. *v. a.* [*arrego*, Lat.] To claim vainly; to exhibit unjust claims only prompted by pride.—I intend to describe this battle fully, not to derogate from one nation, or to arrogate to the other. *Hayward.*—The popes arrogated unto themselves, that the empire was held of them in homage. *Sir Walter Raleigh.*

Who, not content

With fair equality, fraternal state,

Will arrogate dominion undeserv'd,

Over his brethren.

Milton.

Rome never arrogated to herself any infallibility, but what she pretended to be found upon Christ's promise. *Tillotson.*

(1.) * **ARROGATION**. *n. f.* [from *arrogate*.] A claiming in a proud unjust manner. *DiB.*

(2.) **ARROGATION**. See **ADROGATION**.

ARROJO DE ST SERVAN, a town of Spain, in Estremadura, 8 miles S. of Merida, and 25 E. of Badajox. Long. 6. 20. W. Lat. 38. 36. N.

ARRON, a river of France, in the department of Nièvre.

ARRONDEE, in heraldry, a cross, the arms of which are composed of sections of a circle, not opposite

opposite to each other, so as to make the arms bulge out thicker in one part than another; but the sections of each arm lying the same way, so that the arm is every where of an equal thickness, and all of them terminating at the edge of the escutcheon like the plain cross.

ARROQUHAR, a parish of Scotland, in Dumbarton-shire, 14 miles long and about 3 broad. In the Gaelic it is pronounced *Arrar*, and wrote *Ardthir*, i. e. a high country; which is descriptive of the place, as it is almost wholly mountainous; notwithstanding which the climate is temperate. By Mr Gillespie's report to Sir John Sinclair, it contained in 1791, 379 inhabitants, which was 87 fewer, than the number in 1755. Of these the greater part are of one name, viz. *Macfarlane*. There were 60 horses, 460 black cattle and 10,600 sheep in the parish, in 1791.

* **ARROSION**. *n. f.* [from *arrosus*, Lat.] A gnawing. *Dist.*

ARROU, a river of France, in the department of Nièvre.

ARROUX, a river of France in the department of Côte d'Or. Perhaps it is the same with **ARROU**, for the two departments are contiguous, and most of our geographers are amazingly inaccurate in their orthography, as well as in their descriptions and delineations of rivers in general.

(I. 1.) * **ARROW**. *n. f.* [*arere*, Sax.] The pointed weapon which is shot from a bow. Darts are thrown by the hand, but in poetry they are confounded.—

I swear to thee by Cupid's strongest bow,
By his best *arrow* with the golden head.

Shakespeare.

Here were boys so desperately resolved, as to pull *arrows* out of their flesh, and deliver them to be shot again by the archers on their side. *Hayward.*

(2.) **ARROW**. See **ARCHERS**, § 2, 4, & **ARCHERY**, § 2, 3.

(II.) **ARROW**, in astronomy, trigonometry, &c. See **SAGITTA**.

(III.) **ARROW**, in fortification, is a work placed at the salient angles of the glacis, and consists of two parapets, each forty toises long. This work has a communication with the covert way, of about 24 or 30 feet broad, called *caponier*; and a ditch before it, of 5 or 6 toises.

(IV. 1.) **ARROW**, in geography, a river in Worcester-shire and Warwickshire.

(2. 3.) **ARROW**, two villages, 1. in Cheshire, between the river Dee and Lancaster: and 2. in Warwickshire, near Aulcetter.

(V.) **ARROW**, in surveying, is used for small straight sticks about two feet long, shod with iron ferrils. Their use is to stick into the ground at the end of the chain.

ARROW, ELF. See **ELF-ARROWS**.

(1.) * **ARROW-HEAD**. *n. f.* [from *arrow* and *head*] A water plant, so called from the resemblance of its leaves to the head of an arrow. *Dist.*

(2.) **ARROW-HEAD**, in botany. See **SAGITTARIA**.

(3.) **ARROW-HEADED GRASS**. See **TRIGLOCHIN**.

(4.) **ARROW-HEADS**, or **ARROW STONES**, in antiquity, pieces of barbed flint, thin and sharp at the points, with which our ancestors armed their arrows. Specimens of them are often found in

various places of Scotland, and preserved by antiquarians.

ARROW, MAGICAL, a sort of weapon very common among the barbarous inhabitants of Lapland, and many of the northern climates; and supposed to possess very strange virtues.

ARROW-MAKERS are also called *fletchers*; and were formerly, as well as bowyers, persons of great consequence in the kingdom. Arrow heads and quarrels were to be well boched or braced, and hardened at the points with steel; the doing of which seems to have been the business of the arrow-smith.

ARROW-ROOT. See **MARANTA**.

ARROW STONES. See **ARROW-HEADS**, § 4.

ARROW, WILDFIRE. See **WILDFIRE**.

(1.) * **ARROWY**. *adj.* [from *arrow*.] Consisting of arrows.—

He saw them in their forms of battle rang'd,
How quick they wheel'd, and flying, behind
them shot

Sharp fleet of *arrowy* show'r against the face
Of their pursuers, and o'ercame by sight.

Milton.

ARS, [Lat. from *ars*, utility, Gr.] Art. The word is often conjoined with adjectives expressing particular, real, or pretended arts; such as,

1. **ARS NOTORIA**, a pretended manner of acquiring sciences by infusion, without any application, except fasting, and performing certain ceremonies! This art was condemned by the Synod of Arles, A. D. 1320.

2. **ARS THESSALICA**, the Thessalian art, is used by ancient writers, for a species of magic, whereby it was pretended, they could draw the moon and stars out of heaven! It was denominated Thessalian from its supposed inventors, the people of Thessaly.

ARSACES, called by some **MITHRIDATES**, a king of the Parthians, spoke of in the I. book of Macabees, xiv. 2. He considerably enlarged the kingdom of Parthia by his good conduct and valour. See **PARTHIA**.

ARSACIDÆ, the royal family of Parthia, so named from Arsaces the founder. See last article.

ARSAMAS, a town of Russia, in the territory of Morduates, seated on the river Mockcha, on the road to Astracan, 300 miles S. by E. from Moscow, and 500 N. by W. from Astracan. At this place Gen. Dolgorucki punished the rebellious Cossacks.

ARSCHIN, a long measure used in China, to measure stuffs; of the same length with the Dutch ell, which is 2 feet 11 lines. Four *arschins* make 3 yards English.

ARSCHOT, a town of France, in one of the new departments, formed since the capture of the ci-devant Austrian Netherlands, but of which we have as yet seen no map. It is seated on the Demer, 4 miles E. of Mechlin. Long. 4. 45. E. Lat. 51. 5. N.

* **ARSE**. *n. f.* [*earge*, Sax.] The buttocks, or hind part of an animal.

* **ARSE FOOT**. *n. f.* A kind of water fowl, called also a *didapper*. *Dist.*

ARSE-HILL-TOUN, an ancient name of Earls-toun, a village in Berwickshire, so called from its low situation. See **EARLS-TOUN**, N° 2.

ARSELLA,

Tota Vigoribus debilitata Parure.

are artificially appropriated to naval furniture and ornaments. At Marseilles is the arsenal for ships, and at Toulon, Rochefort, and Brest, those for the men of war.

ARSENIC, a heavy opaque substance, usually in white masses, which, when broken, has a semi-transparency somewhat resembling that of sulphur, but by exposure to the air becomes white and opaque like the outside of the metals. By various chemical processes it is made to assume the appearance either of a salt or metal, at the pleasure of the operator and therefore has been considered both as a substance and a semi-metal. See Dr Johnson's account of it, § 3.

ARSENIC, ANCIENT ACCOUNTS OF. It is not at what time this mineral was discovered, though, as it abounds among many different kinds of ores, it is probable that the properties it manifests would very soon make it known to metallurgists. Aristotle mentions a substance called *Zaisarey*, a disciple Theophrastus makes mention of *arsenikon*, which by Dioscorides and others is called *arsenicum*, about the beginning of christian era. By this, however, it appears, they only meant the substances now called *red and white arsenic*, and Avicenna, who lived in the 10th century, is the first who expressly mentions arsenic, as well as its sublimation. It is known by whom arsenic was first reduced to metallic form. Paracelsus asserts that arsenic, and with egg-shell lime becomes like silver. In 1600, M. Linnæus makes mention of a method of subliming arsenic with fixed alkali and

ARSENIC, DIFFERENT OPINIONS RESPECTING. The true nature of arsenic has been little known, it is no wonder to find chemists offering much as to the class of natural bodies in which it ought to be placed. Avicenna and a number of others class it with the sulphurs; others, as Bergman and his followers, among the acids. Boerhaave considers it as a kind of soap, or sulphureous body. Latest experiments, how-

ever, Part II.

ever, Part II. But if we examine this nomenclature a little more accurately, we shall see it is extended too far; for if this be admitted, we must at the same time allow, that no native metal is to be found. Thus the gold called *native*, is seldom if ever found pure, but more or less mixed with copper or silver, and so with other metals. If, therefore, arsenic, which, unless in its regular state, never dissolves other metals, be considered as a mineralizing substance, what hinders us from saying that gold is mineralized by silver or copper, and is general every metal mineralized by some other? It is much more natural to suppose that those metals are mineralized which are actually dissolved and concealed by a menstruum. Sulphur is the chief agent employed by nature for this purpose, and though the acids of vitriol, phosphorus, &c., and sometimes even the acrid acid, occasion the metals to pass on an appearance foreign to their nature, yet the number of these is so small, that, compared with the sulphurated minerals, they almost vanish. This mineral, so troublesome to the metallurgist, occasioned the alchemists to suspect the existence of a certain essential principle indispensable to the perfection of every metal. Even so late as 1771, a question to this purpose was proposed by the Royal Academy of Sciences at Berlin: the prize was adjudged to M. Monnet, who in his answer considered arsenic as a semi-metal of a peculiar kind, which is so far from constituting any essential part of metals, that its presence is always attended with insupportable evils, either by carrying off the metal as it has a way, or by doing the work in which it remains. These considerations, however, do not hinder us from asserting that the acid of arsenic, like others, is a mineralizing substance, if at any time it happens to meet with such as in the bowels of the earth, and to unite with it in that form. Arsenic in its pure state is well known to be a most destructive and deadly poison, for which the art of medicine has scarcely as yet afforded a cure. Mr Bergman is of opinion that it acts as an highly corrosive acid, even when applied externally. He also tells us, that the dry acid is more destructive than white arsenic; the regulus and residuum left

662

fo. From an experiment of Mr Scheele, however, in which 8 grains of arsenical acid were given to a cat, it does not appear that it acts more violently than white arsenic. The extreme danger attending this substance when taken into the human body, arises from its insolubility, and the difficulty of decomposing it; for there can but little danger arise from a liquid, unless, like corrosive acids, it should at once burn the substance of the stomach like fire; or like laurel water, suspend the action of the nervous system. Corrosive sublimate, solutions of mercury in aquafortis, &c. will as certainly poison as arsenic; but they are much less difficult to cure, because any alkaline substance will certainly decompose them and destroy their deleterious efficacy. Arsenic, on the contrary, cannot be decomposed, nor united with any known substance, at least in such a short time as the exigence of the case we speak of would require, without a considerable degree of heat. It therefore remains in the stomach, continually exerting its mischievous qualities, unless it can be discharged by vomiting.

(5.) ARSENIC, EFFECTS OF, WHEN SWALLOWED. The symptoms attending arsenic when swallowed are, nausea, sickness, and retching to vomit, about half an hour after it is taken. These are followed by violent vomitings, hiccups, and pains in the stomach and bowels. Convulsions and palsies of the limbs presently succeed, with intense heats, cold sweats, palpitations of the heart, extreme anxiety, prostration of strength, thirst and dryness of the mouth and throat, loss of reason, and at last death. If the quantity taken was considerable, the patient dies in 7 or 8 hours after taking it; and the stomach and intestines are found, upon dissection, to be corroded and perforated. When this is not the case, violent putrefactive symptoms soon ensue after arsenic is swallowed; for the bodies of those who are poisoned by it generally have abundance of red or purple spots even before death. It remarkably inflames the coats of the stomach, and the putrefaction is said particularly to take place in the genitals of men. Mr Bergman relates, that in the body of a man who was poisoned with arsenic, and dissected in the anatomical theatre at Upsal, the putrefaction had been so strong, that the mineral was deprived of part of its phlogiston, and emitted the garlic smell, that peculiar characteristic of arsenic when in this situation.

(6.) ARSENIC, INEFFICACY OF ANTIDOTES AGAINST. Many antidotes have been proposed against this dreadful poison by authors of the highest reputation; but it is to be feared without that success which the confidence of those who proposed them seemed to ensure. Indeed, previous to any great hope of success in this respect, it ought to be shown that these antidotes are able to effect some considerable change on arsenic when out of the body; and that not in solution, but when in a powder not very fine, as is the case with arsenic when it is usually taken. Mr Bergman recommends alkalies in diseases occasioned by arsenic: Nay he tells us, that "since phlogiston and alkalies are the most correctors of acid acrimony, it will

readily occur, how it may be mitigated, and its deleterious effects obviated." But the many fatal accidents consequent on taking this mineral, show that none of those are to be depended upon — Bergman himself indeed cautions us against trusting to phlogiston correctors alone; and perhaps, the solution of hepar sulphuris, which contains the united powers of both the alkaline and phlogistic antidotes united, might prove more efficacious than either of them singly. Oils, fats, milk, warm fat broths, fresh butter, &c. have all been recommended; and, no doubt, in such deplorable cases, are those remedies to which we can most readily have recourse: but, even here, it is evident, that their efficacy must be exceedingly dubious, whatever their intrinsic virtues may be; and for this plain reason, that the arsenic is already in contact with the stomach, and though the remedies might have prevented its action, had they been *first* swallowed, their operation must be much less powerful after the poison has had access to the stomach, and begun to exert its pernicious effects.

(7.) * ARSENICK. *n. f.* [*arsenium*.] A ponderous mineral substance, volatile and unflammable, which gives a whiteness to metals in fusion, and proves a violent corrosive poison; of which there are three sorts. *Native* or *yellow arsenick*, called also auripigmentum or orpiment, is chiefly found in copper mines. *White* or *crystalline arsenick* is extracted from the native kind, by subliming with a portion of sea salt. The smallest quantity of crystalline *arsenick*, being mixed with any metal, absolutely destroys its malleability; and a single grain will turn a pound of copper into a beautiful seeming silver, but without ductility. *Red arsenick* is a preparation of the white, made by adding to it a mineral sulphur. *Chambers*. — *Arsenick* is a very deadly poison; held to the fire, it emits fumes, but liquates very little. *Woodward*.

(8.) ARSENIC, MEDICAL PRESCRIPTIONS OF. Notwithstanding the dreadful effects of arsenic when taken in large quantity, attempts have been wanting to introduce it into the materia medica. The disease, indeed, in which they have been recommended, (the cancer) is of a very incurable nature, at least by ordinary medicines. M. le Febvre, a French physician, some time ago published a treatise, in which he recommended pure white arsenic, as a specific in that disease. The dose was four French grains, equal to $3\frac{1}{2}$ English, dissolved in a French pint (16 ounces) of distilled water. A table spoonful of this solution is to be taken with an equal quantity of milk, and half an ounce of syrup of pomegranate every morning fasting, and taking care to eat nothing for an hour after. This course must be continued 8 days; after which, a dose is to be taken twice every day in the same manner, once in the morning, and another at twelve at night. At the end of a fortnight, three doses may be exhibited daily, the third being taken at mid-day. Thus people of a weakly constitution may continue till the cure is completed; but such as are more robust, may gradually augment the dose till two table spoonfuls are taken at each time with as much milk, and half an ounce of syrup.

of poppies. Children must on no account take more than three tea spoonfuls a day, with a proportional quantity of syrup of poppies. For adults, the strength of the solution, as well as the quantity, is to be augmented; six grains being put into the second bottle, and eight into the third; and a purgative, composed of manna, rhubarb, and sal seignette, is to be given every eight or twelve days. An issue he considers as useful in every case. The tumour, if not ulcerated, ought to be washed with a solution of arsenic, in the proportion of eight grains to a pint; and he prescribes the following cataplasm. "Take of caraway juice one pound, of sugar of lead half an ounce, of liquid laudanum a dram and an half; mix the whole into a mass with as much powder of hemlock as is sufficient for the purpose. The tumour is to be covered to a moderate thickness with this cataplasm, which is to be kept on by a archylon plaster." When the cancer is of the ulcerated kind, he directs the ichorous serosity to be taken away by means of dry *charpie* at each dressing, and the sore to be fomented with the arsenical solution with the chill taken off it, and having about a third part of red wine added to it. When the sore is of a very bad kind, he proposes arsenic to be dissolved in decoction of bark for the purpose of fomentation; after which, the cataplasm and plaster are to be applied, and this to be renewed every twelve hours. Mr Le Ferre asserts, that the arsenic, when taken with the precautions just mentioned, is not attended with any bad consequences, nor has it a disagreeable taste. Its action is scarcely perceived on any of the secretions or excretions; though some distill their urine more freely than usual, and in some the belly is more loose. In some, the expectoration is more copious; but these effects are neither regular nor constant. He does not consider it as an infallible cure for the distemper in every possible stage; but thinks, that the disease is curable, when, in its progress, it has eroded a blood-vessel, and occasioned a considerable hemorrhagy; also when the patient is of a hectic or phthical habit of body. With respect to regimen, he directs whey, with twelve grains of nitre to the bottle, or a weak decoction of althea, with an equal quantity of nitre; and to abstain from wine and fermented liquors. Broth made with veal, or chicken, is also proper. Mr Bergman informs us, that "it can hardly be doubted that arsenic may be applied to valuable purposes in medicine, and experiments have long ago put it out of doubt; but with respect both to its use and preparation, the utmost caution is necessary."

(9.) ARSENIC, MEDICAL USE OF, DISAPPROVED. Dr BLACK, says, he has seen the internal use of arsenic, in those cases where it is recommended by foreign physicians, attended with very dangerous consequences, such as hectics, &c. He has likewise known obstinate ulcers healed by it. Yet though the external use of arsenic has proved successful in some cases, it has often, even in this way, produced very terrible consequences: that the Doctor, far from recommending the internal use of it, reprobates it even in external applications.

(10.) ARSENIC, MEDICAL USE OF, PROVED BENEFICIAL. The following account of the use of arsenic in medicine, is given by Dr ANDREW DUNCAN. "Notwithstanding, however, the very violent effects of arsenic, it has been employed in the cure of diseases, both as applied externally and as taken internally. Externally, white arsenic, has been chiefly employed in cases of cancer; and, as used in this way, it is supposed, that its good effects depend on its acting as a peculiar corrosive: and it is imagined, that arsenic is the basis of a remedy long celebrated in cancer, which, however, is still kept a secret by a family of the name of Plunket, in Ireland. According to the best conjectures, their application consists of the powder of some vegetables, particularly the *ranunculus flammæus*, and *cotula fœtida*, with a considerable proportion of sulphur, intimately mixed together. This powder, made into a paste with the white of an egg, is applied to the cancerous part, which it is intended to corrode; and being covered with a piece of thin bladder, smeared also with the white of an egg, it is suffered to lie on from 24 to 48 hours; and afterwards, the eschar is to be treated with softening digestive, as in other cases. Arsenic, in substance, to the extent of an eighth of a grain for a dose, combined with a little of the flowers of sulphur, has been said to be employed internally, in some very obstinate cases of cutaneous diseases, and with the best effect. But of this we have no experience. Of all the diseases in which white arsenic has been used internally, there is no one in which it has been so frequently and so successfully employed as in the cure of intermittent fevers. It has long been used in Lincolnshire, and some other of the fenny countries, under the name of the *arsenic drop*, prepared in different ways: And it is conjectured, that an article, which has had a very extensive sale, under the title of the *tasteless ague-drop*, the form of preparing which, however, is still kept a secret, is nothing else but a solution of arsenic. But whether this be the case or not, we have now the most satisfactory information concerning this article, in the "Medical Reports, of the effects of Arsenic, in the cure of agues, remitting fevers, and periodic head-achs," by Dr Fowler of Stafford. He directs, that 64 grains of arsenic, reduced to a very fine powder, and mixed with as much fixed vegetable alkaline salt, should be added to half a pound of distilled water in a Florence flask; that it should be then placed in a sand heat, and gently boiled, till the arsenic be completely dissolved; that after the solution is cold, half an ounce of compound spirit of lavender be added to it, and as much distilled water, as to make the whole solution amount to a pound. This solution is taken in doses, regulated according to the age, strength, and other circumstances of the patient, from two to twelve drops, once, twice, or oftener, in the course of the day. And in the diseases mentioned above, particularly in intermittents, it has been found to be a safe and very efficacious remedy, both by Dr Fowler, and by other practitioners: but in some instances, even when given in very small doses, we have found it excite violent vomiting. But besides this, it has also been alledged by some, that



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the blackness. The other probatory liquor is also rendered ineffectual by a large quantity of tartar; because the tartareous acid, uniting with the lime, forms a kind of selenite, which in like manner diminishes the blackness. Arsenic sometimes enters metallic compositions, especially copper and tin; but it were much to be wished that such compositions were banished, at least from the kitchen. Shot made of lead is sometimes hardened by orpiment. Regulus of arsenic enters into the composition of Meuser's phosphorus. The power of the calx in vitrification, was long ago known to Geber; and it is frequently employed in glass-houses, either for facilitating fusion, for acquiring a certain degree of opacity, or finally for carrying off phlogiston. The method in which mountain-crystals, placed over orpiment, white arsenic, crude antimony, and sal ammoniac, mixed in a crucible, are tinged by means of heat, is described by Neri, and upon trial is found to be true. I have thus obtained these crystals beautifully marked with red, yellow, and opal spots; but at the same time cracked, which could scarcely be avoided. In painting, too, the artists sometimes employ arsenic. Painters in oil frequently use both orpiment and realgar; and it is probable that wood covered with a pigment mixed with white arsenic would not be spoiled by worms.—A most beautiful green pigment may be precipitated from blue vitriol by means of white arsenic dissolved in water, together with vegetable alkali. This prepared either with water or oil, affords a colour which suffers no change in many years.—The playthings of children, however, should not be painted with this or any other preparation of arsenic, on account of their custom of putting every thing into their mouths. Arsenic is also used in dyeing, and the yellow combination of it with sulphur has the property of readily dissolving indigo; for which purpose it is used in cloth-printing. It lets it fall again, however, on exposure to the air; and therefore can be employed only in pencil-colours, where a large quantity is laid on at once. The neutral arsenical salt is used in some manufactures in France; but for what purposes is not known.

(17.) ARSENIC, WHITE. See § 7 and 18.
(18.) ARSENIC, YELLOW, OR NATIVE, is called *orpiment*. Our yellow and red arsenic are artificial, being only white arsenic mixed with different proportions of sulphur. The white is the strongest, the yellow is weaker, and the red weakest. White arsenic, sublimed with one tenth of its weight of sulphur, is yellow; and with one fifth it is red. Both the yellow and the red fossil arsenics, when of a smooth texture, are called *larnichs*; but when composed of small scales or leaves, they are called *auripigmenta*, or *orpiments*.

* ARSENICAL. *adj.* [from *arsenick*.] Containing *arsenick*; consisting of *arsenick*.—An hereditary consumption, or one engendered by *arsenical* fumes under ground, is incapable of cure. *Harvey*.—There are *arsenical*, or other like noxious minerals lodged underneath. *Woodward*.

ARSENICAL MAGNET, *MAGNES ARSENICALIS*, is a preparation of antimony, with sulphur and white arsenic.

ARSENIUS, a deacon of the Roman church, of great learning and piety, who was pitched upon by the pope to go to the emperor Theodosius, as tutor to his son Arcadius. Arsenius arrived at Constantinople, A. D. 383. The emperor, happening one day to go into the room where Arsenius was instructing his pupil, found Arcadius seated and the preceptor standing; at this he was exceedingly displeased, took from his son the imperial ornaments, made Arsenius sit in his place, and ordered Arcadius for the future to receive his lessons standing uncovered. Arcadius, however, profited but little by his tutor's instructions, for some time after he formed a design of dispatching him. The officer to whom Arcadius had applied for this purpose, divulged the affair to Arsenius, who retired to the deserts of Scete, where he passed many years in exercises of devotion, and died aged 95.

ARSENOTHELYS, [from *arsen* and *θηλυς*, male and female,] among ancient naturalists, the same with hermaphrodite.

ARSES, or ARSAMES, king of Persia, succeeded Artaxerxes Ochus, about A. M. 3612, and after a short reign of less than 4 years was slain by Bagoas, who had murdered his predecessor, and succeeded by Darius Coddomannus.

* ARSE-SMART. *n. s.* [*periscaria*, Lat.] An herb.

* ARSE, TO HANG AN, A vulgar phrase, signifying to be tardy, sluggish, or dilatory.—

For Hudibras wore but one spur,
As wisely knowing, could he stir
To active trot one side of's horse,
The other would not *hang an arse*. *Hudibras*.

ARSE-VERSE, in antiquity, a term, or formula inscribed on doors, to prevent fire. It is said to be of Tuscan origin, where the word *arse* signifies avert, and *verse*, fire.

ARSE-VERSY. See ARSY-VERSY.

ARSHAM, a village in Yorksh. near the Tees.

ARSHOT. See ARSCHOT.

(I.) ARSINOE, in ancient geography, the name of 15 towns, mentioned by Strabo, Ptolemy, Stephanus, &c. viz. (1—5) of five towns in Cilicia, one of which had a station for ships; (6—8) of 3 in or near Cyprus; viz. one inland, formerly called *MARIUM*; another N. of it, between Acanthos and Soli, and the 3d in the S. with a port, between Citrum and Salamis: 9, a sea port in Cyrene, formerly called *TEUCHIRA*: 10, a town in Egypt near the W. extremity of the Arabian gulph, and S. of Hierapolis, called also *CLEOPATRA*: 11, another in the Nomos Arsinoites, mentioned on some coins of Adrian, and formerly called *Crocodilorum Urbs*, from its abounding with crocodiles: Ptolemy calls this town an inland metropolis, with a port called *PTOLEMAIS*: 12, a sea port of Lycia, formerly named *PATARA*; but called Arsinoe, by Ptolemy Philadelphus after his queen: and, (13, 14, 15,) three towns of Troglodytæ, the chief of which was situated near the mouth of the Arabian gulf, which towards Ethiopia is terminated by a promontory called *DIRE*. This Arsinoe is called *BERENICE*, with the distinction *Epidires*; because situated on a neck of land running out a great way into the sea.

(II.)

of hunting, and must have been made by some persons of more power and consequence than any usually residing in this country. In the middle of the loch are two islands, one of them much less than the other. On the larger, are the rude walls still remaining of a very ancient building, made of common round stones, but cemented with mortar. This is said to be the place where the kings retired from hunting, and feasted on their game. In the neighbouring island, which is called *Eilean a' Ghar*,

than the mind: of which kind are those which furnish us with the necessary food for life, as baking, brewing, carpentry, smithery, &c. &c.—The latter are such as depend more on labour of the mind than that of the hand, and are the produce of the IMAGINIST or, what is called, the POET. The former are the produce of the SENSITIVE, and the latter of the IMAGINIST. Of this kind are poetry, &c.

music, &c. These last are also termed the FINE ARTS. But indeed this last class might admit of a SUBDIVISION. Under the term *Fine Arts* for instance, we would comprehend only those, which along with the exertions of the *Imagination* require also a high degree of delicate *manual* or *mechanical* labour; such as painting, engraving, sculpture, statuary, &c. to which may be added those which also include *utility*, such as architecture, surgery, &c. To the class of *Polite Arts*, properly and principally belong music, dancing, and dramatic action; and under the term *Liberal Arts*, we would comprehend poetry, grammar, logic, criticism, rhetoric, dramatic writing, and every other literary art, which requires no exertion whatever of the hand or limbs, excepting the mere use of the *pen*, and that without studying the smallest delicacy of *stroke*. But by most authors all these arts are confounded under the general title *fine, liberal, or polite arts*; and therefore, although we think the above sub-division would be fully more proper, we shall comply with custom so far as to use the terms *synonymously* in the following sections of this article.

(4.) ARTS, EARLIEST INVENTIONS OF SUNDRY USEFUL. Some useful arts must be nearly coeval with the human race; for food, cloathing, and habitation, even in their original simplicity, require some art. Many other arts are of such antiquity as to place the inventors beyond the reach of tradition. Several have gradually crept into existence without an inventor. The busy mind, however, accustomed to a beginning in things, cannot rest till it finds or imagines a beginning to every art. The most probable conjectures of this nature the reader may see in the historical introductions to the different articles. In all countries where the people are barbarous and illiterate, the progress of arts is extremely slow. It is vouched by an old French poem, that the virtues of the millstone were known in France before the year 180. The mariner's compass was exhibited at Venice, A. D. 1260, by Paulus Venetus, as his own invention. John Goya of Amalphi was the first who, many years afterward, used it in navigation; and also passed for being the inventor. Though it was used in China for navigation long before it was known in Europe, yet to this day it is not so perfect as in Europe. Instead of suspending it in order to make it act freely, it is placed upon a bed of sand, by which every motion of the ship disturbs its operation! Hand-mills, termed *cornu*, were early used for grinding corn; and when corn came to be raised in greater quantity, horse mills succeeded. Water mills for grinding corn are described by Vitruvius. Wind mills were known in Greece and in Arabia as early as the 7th century; and yet no mention is made of them in Italy till the 14th. That they were not known in England in the reign of Henry VIII. appears from a household book of an Earl of Northumberland, cotemporary with that king, stating an allowance for 3 mill-horses, "two to draw in the mill, and one to carry stuff to the mill and so." Water mills for corn must in England have been of a later date. The ancients had mirror glasses, and employed glass to imitate crystal vases and goblets; yet they never thought of using it in

windows. In the 13th century, the Venetians were the only people who had the art of making crystal glass for mirrors. A clock that strikes the hours was unknown in Europe till the end of the 12th century. And hence the custom of employing men to proclaim the hours during night; which to this day continues in Germany, Flanders, and England. Galileo was the first who conceived an idea that a pendulum might be useful for measuring time; and Huygens was the first who put the idea in execution, by making a pendulum clock. Hook, in 1660, invented a spiral spring for a watch, though a watch was far from being a new invention. Paper was made no earlier than the 14th century; and the invention of printing was a century later. Silk manufactures were long established in Greece before silk worms were introduced there. The manufacturers were provided with raw silk from Persia: but that commerce being frequently interrupted by war, two monks, in the reign of Justinian, brought eggs of the silk worm from Hindostan, and taught their countrymen the method of managing them.—The art of reading made a very slow progress. To encourage that art in England, the capital punishment for murder was remitted, if the criminal could but read, which in law language is termed *benefit of clergy*. One would imagine that the art must have made a very rapid progress when so greatly favoured: but there is a signal proof of the contrary; for so small an edition of the Bible as 600 copies, translated into English in the reign of Henry VIII. was not wholly sold off in three years. The people of England must have been profoundly ignorant in Queen Elizabeth's time, when a forged clause added to the 20th article of the English creed passed unnoticed till about 60 years ago. The discoveries of the Portuguese in the west coast of Africa afford a remarkable instance of the slow progress of arts. In the beginning of the 15th century, they were totally ignorant of that coast beyond Cape Non, in 28° Lat. N. In 1480, the celebrated Prince Henry of Portugal fitted out a fleet for discoveries, which proceeded along the coast to Cape Bajadore in 26° but had not courage to double it: and 76 years elapsed before this was done by Bartholomew Diaz in 1486!

(5.) ARTS, EXCITING CAUSES OF IMPROVEMENTS IN. The exertion of national spirit upon any particular art, promotes activity to prosecute other arts. The Romans, by constant study, came to excel in the art of war, which led them naturally to improve upon other arts. Having, in the progress of society, acquired some degree of taste and polish, a talent for writing broke forth. Nevius composed in verse 7 books of the Punic war; besides comedies, replete with bitter raillery against the nobility. Ennius wrote annals, and an epic poem. Lucius Andronicus was the father of dramatic poetry in Rome. Pacuvius wrote tragedies; Plautus and Terence, comedies. Lucilius composed satires; Fabius Pictor, Cincius Alimentus, Piso Frugi, Valerius Antius, and Cato, were rather annalists than historians, confining themselves to naked facts, ranged in order of time. The genius of the Romans for the fine arts was much inflamed by Greek learning when free intercourse between the two nations was opened.

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very art or operation, he is frequently reduced to supply want of skill by thought and invention. Constant application, on the contrary, to a single operation, confines the mind to a single object, and excludes all *thought* and *invention*: in such a train of life, the operator becomes dull and stupid, like a *beast of burden*. The difference is visible in the manners of the people: in a country where, from want of hands, several occupations must be carried on by the same person, the people are knowing and conversable: in a populous country, where manufactures flourish, they are ignorant, unsociable, and ready for every act of the most Gothic barbarity—witness the riots at London in 1781, and at Birmingham, in 1791; which by the destruction of Lord Mansfield's library, and Dr Priestley's laboratory, did a prejudice to the sciences, which ages of commercial advantage will not compensate for. The same effect is equally visible in countries where an art or manufacture is confined to a certain class of men. It is visible in Indostan, where the people are divided into *casts*, which never mix even by marriage, and where every man follows his father's trade. The Dutch lint boors are a similar instance: the same families carry on the trade from generation to generation; and are accordingly ignorant and brutish even beyond other Dutch peasants. The inhabitants of Buckhaven, a seaport, in the county of Fife, were originally a colony of foreigners, invited hither to teach our people the art of fishing. They continue fishers to this day, marry among themselves, have little intercourse with their neighbours, and are dull and stupid to a proverb.

(7.) ARTS, FINE, PROGRESS OF THE. Useful arts paved the way for fine arts. Men upon whom the former had bestowed every convenience turned their thoughts to the latter. Beauty was studied in objects of sight; and men of taste attached themselves to the fine arts, which multiplied their enjoyments and improved their benevolence. Sculpture and painting made an early figure in Greece; which afforded plenty of beautiful originals to be copied in these imitative arts. Statuary, a more simple imitation than painting, was sooner brought to perfection: the statue of Jupiter by Phidias, and of Juno by Polycletes, though the admiration of all the world, were executed long before the art of light and shade was known. Anaximander, and Zeuxis his disciple, who flourished in the 15th Olympiad, were the first who figured in that art. Another cause concurred to advance statuary before painting in Greece, viz. a great demand for statues of their gods. Architecture, as a fine art, made a slower progress. Proportions upon which its elegance chiefly depends, cannot be accurately ascertained, but by an infinity of trials in great buildings; a model cannot be relied on: for a large and small building, even of the same form, require different proportions.

(8.) ARTS, LIBERAL, HISTORY OF THE. From the fine arts, mentioned in § 7, we proceed to LITERATURE. It is agreed, by all antiquaries, that the first writings were in verse, and that writings in prose were of a much later date. The first Greek who wrote in prose was Pherecides Syrus: the first Roman was Appian Cæcus, who com-

posed a declamation against Pyrrhus. The 4 books of the Chatah Bhadé, which is the sacred book of Indostan, are composed in verse stanzas; and the Arabian compositions in prose followed long after those in verse. To account for that singular fact, many learned pens have been employed; but without success. By some it has been urged, that as memory is the only record of events whose writing is unknown, history originally was composed in verse for the sake of memory. This is not satisfactory. To undertake the painful task of composing in verse, merely for the sake of memory, would require more foresight than ever was exerted by a barbarian: not to mention that other means were used for preserving the memory of remarkable events; such as, heaps of stones, pillars, and other objects that catch the eye. The account given by Longinus is more ingenious. He observes, "that measure or verse belongs to poetry, because poetry represents the various passions with their language; for which reason the ancients, in their ordinary discourse, delivered their thoughts in verse rather than prose." Longinus thought, that anciently men were more exposed to accident and dangers, than when they were protected by good government and by fortified cities. But he seems not to have adverted, that fear and grief, inspired by dangers and misfortunes, are better suited to humble prose than to elevated verse. It may be added, that however natural poetical diction may be when one is animated with any vivid passion, it is not supposable that the ancients never wrote or spoke but when excited by passion. Their history, their laws, their covenants, were certainly not composed in that tone of mind. An important article in the progress of the fine arts, which authors have not sufficiently attended to, will perhaps explain this mystery. This is the profession of a bard, which sprung up in early times, before writing was known, (see WRITING,) and died away gradually as writing turned more and more common. See BARD. The songs of the bards, being universally relished, were certainly the first compositions that writing was employed upon; they would be carefully collected by the most skillful writers, in order to preserve them in perpetual remembrance. The succeeding part of the progress is obvious. People acquainted with no written composition, but what were in verse, composed in verse their laws, their religious ceremonies, and every memorable transaction that was intended to be preserved in memory by writing. But when subjects of writing multiplied, and became more and more involved; when people began to reason, to teach, and to harangue; they were obliged to descend to humble prose: for to confine a writer or speaker to verse in handling subjects of that nature, would be a burden unsupportable. The prose compositions of early HISTORIANS are all dramatic. A writer destitute of art is naturally prompted to relate facts, as he saw them performed: he introduces his personages as speaking and conferring; and he himself relates what was acted, and not spoke. The historical books of the Old Testament are composed in that mode; and so addicted to the dramatic are the authors of those books, that they frequently introduce God himself into the dialogue. At the

is raised upon it, like flowers in embroidery. Homer is admitted by all to be the great master of that mode of composition. The narrative mode came in time to prevail, that in a long chain of history, the writer commonly omits dialogue altogether. Early writers appear to have had little judgment in distinguishing capital facts from minute circumstances, such as can be supplied by the reader without being mentioned. The history of the Trojan war by Dares the Phrygian is a curious instance of that cold and creeping manner of composition. The Roman histories before the time of Cicero are chronicles merely. Cato, Fabius Pictor, and Piso, confined themselves to naked facts. In the Augustan Historiographers we find nothing but a dry narrative of facts, commonly of very little moment, concerning a degenerate people, without a single incident that can rouse the imagination or excite the judgment. The monkish histories are all of them composed in this manner. The dry narrative being very little interesting or agreeable, a taste for embellishment prompted some writers to be copious and verbose. Saxo Grammaticus, who in the 12th century composed in Latin a history of Denmark, surprising pure at that early period, is extremely verbose and full of tautologies. Such a style, at the best, appears out of place in a modern tongue, before it is enriched with a stock of phrases for embellishing the great variety of incidents that enter into history. The perfection of historical composition, which seems at all attainable, after wandering through various imperfect modes, is a relation of interesting facts, connected with their motives and consequences. A history of that nature is a connected chain of causes and effects. The history of the ancients, and still more that of the Romans, is deficient in this mode. Eubulus, a satirist of a later age than the art of literary composition; for till the latter was improved, there were no models for studying the former.

poets, whose compositions are wonderful productions of genius, considering that the Greeks of that period were but beginning to engrave familiarity into a taste for literature. The masterpieces of Æschylus, Sophocles, and Euripides must have been highly valued among a people who had no idea of any thing more perfect, to judge by comparison, and every work is to be perfect that has no rival. But a thought kept in view, that it was not the dullest and chiefly educated the Athenians, nor were the passions represented, nor perfection in the poets, but machinery and pompous decorations joined with exquisite music. That thick mass of passions was carried to the greatest height, and conclude from the extravagant fancies before them the exhibiting a single tragedy was as expensive to the Athenians as their best army in any single campaign. One would imagine, however, that these compositions were simple to enchant for ever, as surely is the sentiment, and passion, is requisite, without the stage will not continue long a favourite to amuse and yet we find not a single improvement attempted after the days of Sophocles and Euripides. The manner of performance, prevented any improvement. A florid passion and refined sentiments would have been no figure on the Grecian stage. Imagine the scolding scene between Brutus and Cassius, or Cæsar to be there exhibited, or the husband in the Misère of Venice. How slight would be the effect, when pronounced in a mask, and blown by a pipe? The workings of nature upon the countenance, and the flexions of voice expressing various feelings, too deeply affecting to admit of representation, would have been entirely lost. A great genius had arisen with talents to compose a pathetic tragedy in perfection, he would have made no figure in Greece. An actor must have been created of a moderate size, new ideas

have been trained to act with a bare face, and to pronounce in their own voice. And after all, there remained a greater miracle still to be performed, viz. a total reformation of taste in the people of Athens. In one word, the simplicity of the Greek tragedy was suited to that manner of acting; and that manner excluded all improvements. It does not appear that the Greek COMEDY surpassed the tragedy in its progress toward perfection. Horace mentions three stages of Greek comedy. The first well suited to the rough manners of the Greeks, when Eupolis, Cratinus, and Aristophanes, wrote. These authors represented on the stage real persons, not even disguising their names: of which we have a striking instance in a comedy of Aristophanes, called *The Clouds*, where Socrates is introduced, and most contemptuously treated. This sort of comedy, sparing neither gods nor men, was afterwards restrained by the magistrates of Athens, so far as to prohibit the naming of persons on the stage. This led writers to do what is done at present: the characters and manners of known persons were painted so much like the life, that there could be no mistake; and the satire was indeed heightened by this regulation, as it was an additional pleasure to find out the names that were meant in the representation. This was termed the *middle comedy*. But as there still remained too great scope for obloquy and libellousness, a law was made prohibiting real events or incidents to be introduced upon the stage. This law happily banished satire against individuals, and confined it to manners and customs in general. Obedient to this law are the comedies of Menander, Philémon, and Diphilus, who flourished about A. A. C. 300. And this is termed the *third stage* of Greek comedy. The comedies of Aristophanes which still remain, err not less against taste than against decency. But the Greek comedy is supposed to have been considerably reduced by Menander and his contemporaries. Their works, however, were far from perfection, if we draw any conjecture from their imitator Plautus, who wrote about a century later. Plautus was a writer of genius; and it may be reasonably proved that his copies did not fall much short of the originals, at least in matters that can be truthfully copied; and he shows very little art, either in his compositions or in the conduct of his pieces. The subject of almost every piece is a young man in love with a music girl, desiring to purchase her from the procurer, and employing a favourite slave to cheat his father out of the price; and the different ways of accomplishing the cheat afford all the variety we find. In some few of his comedies the story rises to a higher tone, the music girl being discovered to be the daughter of a free man, which removes every obstruction to a marriage between her and her lover. In the conduct of his pieces there is a miserable defect of art. Instead of unfolding the subject in the progress of the action, as is done by Terence, and by every modern writer, Plautus introduces a person for no other end but to explain the story to the audience. In one of his comedies, a *household god* is so busy as not only to unfold the subject, but to anticipate before-hand every particular that is to be represented, not excepting the catastrophe! The

ROMAN THEATRE, from the time of Plautus to that of Terence, made a rapid progress. Aristotle defines comedy to be "an imitation of low and trivial subjects, provoking laughter." The comedies of Plautus correspond accurately to that definition: those of Terence rise to a higher tone. Nothing is more evident than the superiority of Terence above Plautus in the art of writing; and, considering that Terence is a later writer, nothing would appear more natural, if they did not copy the same originals. It may be owing to genius that Terence excelled in purity of language and propriety of dialogue; but how can we account for his superiority over Plautus in the construction and conduct of a play? Plautus surely would not imitate the worst constructed plays. This difficulty does not seem to have occurred to any of the commentators. Had the works of Menander and of his contemporaries been preserved, they probably would have explained the mystery; which for want of that light will probably remain a mystery for ever. HOMER has for more than 2000 years been held the prince of POETS. Such perfection in an author who flourished when arts were far short of maturity, is truly wonderful. The nations engaged in the Trojan war are described by him as in a progress from the shepherd state to that of agriculture. Frequent mention is made in the *Iliad* of the most eminent men being shepherds. Andromache, in particular, mentions seven of her brethren who were slain by Achilles as they tended their father's flocks. In that state, garments of woollen cloth were used; but the skins of beasts, the original clothing, were still worn as an upper garment: every chief in the *Iliad* appears in that dress. Such indeed was the simplicity of that early period, that a *black ewe* was promised by each chief to the man who would undertake to be a *spy*. In times of such simplicity, literature could not be far advanced; and it is a great doubt, whether there was at that time a single poem of the epic kind for Homer to imitate or improve upon. Homer is undoubtedly a wonderful genius; his fire, and the boldness of his conceptions, are inimitable. But in that early age, it would fall little short of a real miracle, to find such ripeness of judgment, and correctness of execution, as in modern writers are the fruits of long experience and progressive improvements. That Homer is far from being so ripe, or so correct, cannot escape the observation of any reader of taste. One striking particular is, his digressions without end, which draw our attention from the principal subject. Diomedes, for instance, meeting with Glaucus, in the field of battle, and being in doubt, from his majestic appearance, whether he might not be an immortal, inquires who he was, declaring that he would not fight with a god. Glaucus instead of taking advantage, as one would expect, of the awe his appearance had impressed upon his enemy, lays hold of this slight opportunity, in the very heat of action, to give a long history of his family! Agamemnon desiring advice how to resist the Trojans, Diomedes springs forward; but, before he offers advice, gives the history of all his progenitors, and of their characters, in a long train! And, after all, what was the sage advice that required such a preface? It



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patiment. Another great cause that precipitates the downfall of every fine art is *despotism*. The reason is obvious; and there is a diluvial example of it in Rome, particularly with regard to eloquence. In the decline of that art, it became fashionable to stuff harangues with poetical quotations, without any view but ornament. It happened unluckily for the Romans, and for the world, that the fine arts were at their height in Rome, and not much upon the decline in Greece, when despotism put an end to the republic. Augustus, it is true, retarded their fall, particularly that of literature; it being the politic of his reign to hide *despotism*, and to give his government an air of *freedom*. His court was a school of urbanity, where people of genius acquired that delicacy of taste, that elevation of sentiment, and that purity of expression, which characterize the writers of his time. He honoured men of learning, admitted them to his table, and was grateful to them. The tyranny of Tiberius, and of subsequent emperors, broke at last the elevated and independent spirit of the brave Romans, reduced them to abject slavery, and left not a spark of genius. The science of law is the only exception, as it flourished even in the worst times: the Roman lawyers were a respectable order, and less the object of jealousy than the men of power and extensive landed property.—Among the Greeks also, a conquered people, the arts decayed; but not so rapidly as at Rome; the Greeks, farther removed from the seat of government, being less within the reach of the Roman tyrants. During their depression, they were guilty of the most puerile conceits: witness verses composed in the form of an ax, an egg, wings, and such like. The style of Greek authors, in the reign of Adrian, is unequal, obscure, stiff, and affected. Lucian is the only exception. We ascribe scarce any other cause but despotism, to account for the decline of statuary and painting in Greece. These arts had arrived at their utmost perfection, about the time of Alexander the great; and from that time, they declined gradually with the vigour of a free people; for Greece was now enslaved by the Macedonian power. It may in general be observed, that when a nation becomes stationary in that degree of power, which it acquires from its constitution and situation, the natural spirit subsides, and men of talents become rare. It is still worse with a nation that is sunk below its former power and pre-eminence; and worst of all, when it is reduced to slavery. Other causes concurred to accelerate the downfall of the arts mentioned. Greece, in the days of Alexander, was filled with statues of excellent workmanship; and there being little demand for more, the later statuary was reduced to make medals and busts. At last the Romans put a total stop both to statuary and painting in Greece, by ordering it of its finest pieces; and the Greeks, added to the avarice of the conquerors, bestowing no longer any money on the fine arts. The decline of the fine arts in Rome is, by Petronius ascribed to a cause different from any above mentioned, a taste that overwhelms manhood, as well as the fine arts, where-ever it prevails; and that is *opu-*

lence, joined with its faithful attendants *avarice* and *luxury*. In England, the fine arts are far from such perfection as to suffer by opulence.—They are in a progress, indeed, towards maturity; but they proceed at a very slow pace. Another cause that never fails to undermine a fine art in a country where it is brought to perfection, abstracting from every one of the causes above mentioned, is remarked above; § 5. Nothing is more fatal to an art or science, than a performance so much superior to all of the kind, as to extinguish emulation. This cause would have been fatal to the arts of statuary and painting among the Greeks, even though they had continued a free people. The decay of painting in modern Italy is, probably, owing to this cause: Michael Angelo, Raphael, Titian, &c. are lofty oaks, that bear down young plants in their neighbourhood, and intercept from them the sunshine of emulation. Had the art of painting made a slower progress in Italy, it might have there continued in vigour to this day. The decline of an art or science proceeding from the foregoing cause, is the most rapid where a strict comparison can be instituted between the works of different masters, as between those of Newton and other mathematicians. In Italy, a talent for painting continued many years in vigour, because no painter appeared with such superiority of genius as to carry perfection in every branch of the art. As one surpassed in designing, one in colouring, one in graceful attitudes, there was still scope for emulation. But, when at last, there was not a single perfection, but what one or other master had excelled in, from that period, the art began to languish. Architecture continued longer in vigour than painting, because the principles of comparison in the former are less precise than in the latter. The artist who could not rival his predecessors in an established mode, sought out a new mode for himself, which, though perhaps less elegant or perfect, was for a time supported by novelty. Useful arts will never be neglected in a country where there is any police; for every man finds his account in them. Fine arts are more precarious. They are not relished but by persons of taste, who are rare; and such as can spare great sums for supporting them are still more rare. For that reason, they will never flourish in any country, unless patronized by the sovereign, or by men of power and opulence. They merit such patronage, as one of the springs of government; and a capital spring they make, by multiplying amusements, and humanizing manners; upon which account, they have always been encouraged by good princes.

(10.) ARTS, POLITE, ESSENCE OF THE. The essence of the polite arts, as before observed, consists in *expression*. The end of all these arts is *pleasure*; whereas the end of the sciences is *instruction* and *utility*. Some of the polite arts indeed, as eloquence, poetry, and architecture, are frequently applied to objects that are useful, or exercised in matters that are instructive, as we shall shew more particularly in their proper place; but in these cases, though the ground work belongs to those sciences which employ the understanding, yet the expression arises from the inven-

thousandth part of a numerous army. Indeed the imitation of nature, which appears at first view so simple and so easy, is of all things the most difficult in practice; and it requires a discernment so sagacious, and an expression so happy, as is rarely bestowed on mortal man. IV. PERSPICUITY forms the 4th rule of expression. In all the fine arts, an obscure, perplexed, ambiguous, and elaborate expression, is always bad. The true striking beauty must be manifest and perceptible to the most ignorant of mankind as well as the most learned. Those are ever false or inferior beauties that have occasion for a covering, a kind of veil that may make them appear greater than they really are: true beauty wants no veil, but shines by its native lustre. From the union of the true imitation of nature with perspicuity of expression arises that *truth* which is so essential in the productions of the fine arts. V. In all the polite arts, and in all the subjects they embrace, there must necessarily reign an elevation of sentiment, that expresses each object in the greatest perfection of which it is susceptible; that imitates nature in her most exalted beauty. This makes the 5th general rule. The design of the fine arts being to excite pleasure by the expression of that which is beautiful, every artist should raise himself above his subject; and, choosing the most favourable light wherein to place it, should there embellish it with the greatest, most noble, and beautiful ornaments, that his own genius can suggest; but, however, observing a strict imitation of nature. VI. From the observation of these two last rules results the *SUBLIME*, which is the union of the greatest perspicuity with the strictest truth and the exalted elevation possible. It is necessary to remark here, that the most simple and common objects are susceptible of a sublime that is agreeable to their nature. An idyl or landscape may be as sublime in their kinds as an epic poem or a history piece. When Moses begins the book of Genesis with these words, "In the beginning God created the heaven and the earth;" or when he tells us, that God said "Let there be light, and there was light;" these expressions are sublime in the highest degree, because they are perfectly clear, simple, and elevated. Every author should therefore endeavour after the sublime in every subject that he undertakes; and this makes the 6th and 7th general rule in the practice of the polite arts. *GRANDEUR* and *SUBLIMITY*. But if he cannot attain to this, it is indispensably necessary that he constantly make use of expressions that are *plain and refined*. Every thing that is *low, indelicate, or disagreeable*, is naturally repugnant to the sublime, and ought to be banished from all works that proceed from the liberal arts.

(II.) ART, in the ages of superstition was applied to several absurd practices, such as, ST ANTHONY'S ART, ST PAUL'S ART, &c.

(III.) ART, the second person singular of the verb TO BE, of which the English language affords no variation, except by adopting the plural, by saying *you are*, instead of *thou art*. *Thou beest* indeed was anciently used, but it is quite obsolete.

(IV.) ART AND PART, in Scots law. See ACCESSORY.

ARTTA, or LARTA, a town of Turkey in Eu-

rope, in Lower Albania, seated on the Asdhas, 70 m. N. N. W. of Lepanto, and 20 N. E. of Previsa. It is a pretty large town, and contains about 7000 or 8000 inhabitants, Greeks and Turks, but the former are the most numerous. It has a Greek Archbishop's See. The cathedral has 365 windows and doors, and is supported by above 2000 marble pillars. It was built by Michael Ducas Comnenus emperor of Constantinople. Arta carries on a considerable trade, particularly in tobacco and furs. Long. 21. 20. E. Lat. 39. 28. N.

ARTABA, an ancient measure of capacity used by the Persians, Medes, and Egyptians. The Persian artaba is represented by Herodotus as bigger than the Attic medimnus by three Attic choenixes: from which it appears that it was equal to $6\frac{3}{4}$ Roman modii; consequently that it contained 166 $\frac{3}{4}$ pounds of wine or water, or 126 $\frac{3}{4}$ pounds of wheat. The Egyptian artaba contained five Roman modii, and fell short of the Attic medimnus by one modius; consequently held 133 $\frac{1}{4}$ pounds of water or wine, 100 lb. of wheat, or 60 of flour.

(1.) ARTABANUS, the name of several kings of Parthia. See PARTHIA.

(2.) ARTABANUS, the brother of Darius I. and the uncle and murderer of Xerxes. See ARTAXERXES, N^o 1.

ARTABAZUS, the son of Pharnaces, commanded the Parthians and Chorasmians in the famous expedition of Xerxes. After the battle of Salamis, he escorted the king his master to the Hellespont with 60,000 chosen men; and after the battle of Platæa, in which Mardonius engaged contrary to his advice, he made a noble retreat, and returned to Asia with 40,000 men.

ARTADA, or } is used by some writers for
ARTADAR, } *realgar* calcined, and com-
mended by Paracelsus in malignant ulcers, and by Forestus for the cure of the polypus.

ARTALIS, Joseph, a native of Mazara, A. D. 1628, who showed an early inclination both for poetry and arms. He finished his studies at 15 years of age, when he fought a duel and killed his adversary. He took shelter in a church and afterwards studied philosophy. Candia being besieged by the Turks, he went to its relief, and displayed so much valour, that he was created a knight of St George. Being afterwards engaged in different rencounters and always victorious, he got the title of *Chevalier de Sang*, or the knight of blood. His literary talents obtained him the honour of being elected a member of several academies in Italy, and his military abilities procured him the favour of several princes, particularly of the Emp. Leopold I. and Ernest Duke of Brunswick.

ARTANITA. See LEONTOPETALON.

(I.) ARTAXATA, an ancient city, the royal residence and metropolis of Armenia Major, built according to a plan of Hannibal, for king Artaxias, after whom it was called. It was situated on a branch of the river Araxes, which formed a kind of peninsula, and surrounded the town like a wall, except on the side of the Isthmus, but this side was secured by a rampart and ditch. The town was deemed so strong, that Lucullus, after having defeated Tigranes, durst not lay siege to it; but Pompey compelled him to deliver it without striking a blow. It was the level

suffered the punishment he merited. Some reckon this king as Ahazbucrus who married Ethra, but that as it may, it is certain that he greatly favoured the Jews, by not only authorizing them to return to Judea, and rebuild Jerusalem, but also to collect money for the use of their temple, as well as by remitting their tribute, by encouraging their worship, and by making them a number of valuable presents, &c. See his letter to Ezra, chap. vi. 10. &c. For an account of the other transactions of his reign, see PARSE. He reigned about 4 years, and died A. M. 2469. His son Manasse, surnamed MEFKIM, was his eldest son, succeeded his father Darius II. A. M. 2466, but he continued for his kingdom with his younger brother Lyra, who was assisted by the Greeks, but at last overcame and slain. It was after this battle that Xenophon displayed his generosity by his memorable retreat with his army. Artaxerxes reigned 43 years, and died A. M. 2510. See PARSE.

() ARTAXERXES III. firmamed Ochus, son and successor of Artaxerxes II. was murdered in the 3d year of his reign, (for which see PERS.A.) by Baganes, the Eunuch. A. M. 3692

(*) ARTABAZUS is also the name given in Scripture to, and probably alluded to, the impostor Orovastes, who pretending to be Smerdis, the son of Cyrus, reigned 5 months in Persia, after the death of Cambyses. During his short reign, the crimes of the Jews applied for, and obtained, an interdict of the rebuilding of the city.

ARTAX, AR, the founder of the kingdom of Armenia Major. See ARMENIA, § 2 & 4, and ARTAXATA. N^o 1

ARTIDIUM: A genus of the digyna order, belonging to the pentandria class of plants; and is the natural method ranking under the 45th order Umbellales. The involucre are penultid; the

Dalton. He styled himself the *Epitaph* on his performance, and he was only twenty-one years of age when he wrote the first of his *Epitaphs*, a dream written concerning the epidemic which, amounting to many thousands of the likewise spent many years in travelling, in order to contrive an acquaintance with knowledge: he also carried on an extensive commerce with all the people of this sort in Germany, and the most populous islands of all the old dreams, and the events which were to have followed them. The work was published in 1704, and was the first of the *Epitaphs* dedicated to one Cassius Maximus, and the two to his son, whom he took a great deal of interest in the nature and interpretation of dreams. This work, though filled with observations, contains fewer things more than it. It was first printed in Greek at Venice, and in Italian at Rome, and was translated into Greek and Latin, in 1704, and added to the *Epitaphs* of the same author, which were published by Aeternus under the title of *Epitaphs* in 1704.

ARTÉMIS, an epithet of Diana. See
NUTIA. No IV.

[illegible]

in order to return to Asia. These great qualities did not secure her from the weakness of love: she was passionately fond of a man of Abydos, whose name was Dardanus, and was so enraged at his neglect of her, that she put out his eyes while he was asleep. This, however, did not extinguish her passion, which, perhaps being now mingled with pity and regret for what she had done, increased instead of being diminished. Whereupon he consulted the Delphian Oracle how to get rid of it, and being advised to go to Leucas, which was the usage of desperate lovers, she took the ship from thence, and was drowned and interred at that place. Many writers confound this Artemisia with the wife of Mausolus. See No. II.

(II.) ARTEMISIA, II. queen of Caria, the widow of King Mausolus, has immortalized herself by the honours which she paid to the memory of her husband. She built for him, in Halicarnassus, a very magnificent tomb, called the *Mausoleum*, which was one of the 7 wonders of the world, and from which the title of *Mausoleum* was afterwards given to all tombs remarkable for their grandeur; and she died of grief before the Mausoleum was finished. Her affection for him was so great that she is said to have drank his ashes. She appointed panegyrics to be made in honour of him, and proposed a prize of great value for the person who would compose the best. He died about the end of the 106th Olympiad, A. A. C. 351.

(III. I.) ARTEMISIA, MUGWORT, SOUTHERNWOOD, and WORMWOOD: A genus of the polyamia superflua order, belonging to the syngeneclasis of plants; and in the natural method ranked under the 49th order, *Compositæ nucamentaceæ*. The receptacle is either naked or a little downy; has no pappus; the calyx is imbricated with scaly scales; and the corolla has no radii.—There are 23 species, of which the following are the most remarkable: viz.

1. ARTEMISIA AEROTANUM, or southernwood, which is kept in gardens for the sake of its agreeable scent, is a low shrub, seldom rising more than 3 or 4 feet high, sending out lateral shrubby branches, growing erect garnished with five bristly leaves, having an agreeable scent when bruised: flowers are produced in spikes from the extremities of the branches; but unless the autumn is warm, they seldom open in England.

2. ARTEMISIA ABSINTHIUM, or common wormwood, grows naturally in lanes and uncultivated places, and is too well known to require any particular description.

3. ARTEMISIA ARBORESCENS, or tree-wormwood, grows naturally in Italy and the Levant near the sea. It rises, with a woody stalk, 6 or 8 feet high, sending out many ligneous branches, garnished with leaves somewhat like those of the common wormwood, but more finely divided, and much whiter. The branches are terminated by spikes of globular flowers in the autumn, which seldom succeeded by seeds in this country.

4. ARTEMISIA DRACUNCULUS, or TARRAGON, is frequently used in salads, especially by the French, and is a very hardy plant, spreading greatly by its creeping roots.

5. ARTEMISIA MARITIMA, or sea wormwood, grows naturally on the sea-coasts in most parts of Europe. **OL. II. PART II.**

Britain, where there are several varieties, if not distinct species, to be found. These are low under shrubs, most of which creep at the root, by which they multiply greatly in their natural situation, but when transplanted into gardens seldom thrive so well.

6. ARTEMISIA PONTICA, or Pontic wormwood, commonly called *Roman wormwood*, is a low herbaceous plant, whose stalks die in autumn, and new ones appear in the spring. They are garnished with finely-divided leaves, whose under sides are woolly; and the upper part of the stalks are furnished with globular flowers which nod on one side, having naked receptacles. These appear in August, but are rarely succeeded by seeds in Britain.

7. ARTEMISIA SANTONICUM produces the fennel santonicum, which is much used for worms in children. It grows naturally in Persia, from whence the seeds are brought to Europe. It hath the appearance of our wild mugwort; the branches are slender, erect, and garnished with linear winged leaves, and terminated by recurved slender spikes of flowers which have naked receptacles.

8. ARTEMISIA VULGARIS, or common mugwort, grows naturally on banks and by the sides of foot paths in many parts of Britain; so is seldom admitted into gardens, where it would prove a troublesome weed, as it spreads very fast by its creeping roots. It flowers in June, at which time the plant is ready for use.

(2.) ARTEMISIA, CULTURE OF THE. The southernwood is propagated by slips or cuttings planted in a shady border about the beginning of April, observing to water them duly in dry weather. In this border they may remain till the following autumn, when they should be transplanted, either into pots or those parts of the garden where they are to remain. The santonicum is likewise propagated by slips: but the plants should be placed in a dry soil and sheltered situation, where they will endure the cold of our ordinary winters pretty well; though it will be proper to have a plant or two in pots, which may be sheltered under a common hot-bed frame in winter, to preserve the species. The true wormwood is easily propagated in the same manner.—The cuttings must be planted in a shady border, and duly watered during the summer season, in which case they will take root freely. In autumn some of the young plants should be potted, that they may be sheltered in winter; the others may be planted in a warm border, where they will live, provided the winter proves favourable. The other sorts spread by their creeping roots; and require no culture, as they are very hardy, and will thrive any where.

(3.) ARTEMISIA, MEDICINAL USES OF THE. The seeds of the santonicum are small, light, chafy, composed as it were of a number of thin membranous coats, of a yellowish colour, an unpleasant smell, and a very bitter taste. They are celebrated for anthelmintic virtues, which they have in common with other bitters, and are sometimes taken in this intention, either along with molasses or candied with sugar. They are not often met with genuine in the shops. The leaves of the sea, common, and Roman wormwoods, are used as

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light. Though crowded into a narrow compass, and having the enemy on every side, they soon took 30 of their ships, and sunk many more.— Night came on, accompanied with an impetuous storm of rain and thunder; the Greeks retired into the harbour of Artemisium; the enemy were driven to the coast of Thessaly. By good fortune, however, rather than by design, the greatest part of the Persian fleet escaped immediate destruction, and gained the Pegasean bay; but the ships ordered to sail round Eubœa met with a more dreadful disaster. They were overtaken by the storm, after they had adventured further from the shore than was usual with the wary mariners of antiquity. Clouds soon intercepted the stars, by which alone they directed their course; and after continuing during the greatest part of the night the sport of the elements, they all perished miserably amidst the shoals and rocks of an unknown coast. The morning arose with different prospects and hopes to the Persians and Greeks. To the former it discovered the extent of their misfortunes; to the latter it brought a reinforcement of 53 Athenian ships. Encouraged by this favourable circumstance, they determined again to attack the enemy, at the same hour as on the preceding day, because their knowledge of the coast, and their skill in fighting their ships rendered the dusk peculiarly propitious to their designs. At the appointed time, they sailed towards the mouth of Aphete; and having cut off the Cilician squadron from the rest, totally destroyed it, and returned at night to Artemisium. The Persian commanders being deeply affected with their repeated disasters, but still more alarmed at the much dreaded resentment of their king, determined to make one vigorous effort for restoring the glory of their arms. By art and stratagem, and under favour of the night, the Greeks had hitherto gained many important advantages. It now belonged to the Persians to choose the time for action. On the 3d day at noon, they sailed forth in the form of a crescent, still sufficiently extensive to unfold the Grecian line. The Greeks, animated by former success, were averse to decline any offer of battle; yet it is probable that their admirals, and particularly Themistocles, would much rather have delayed it to a more favourable opportunity. Rage, and resentment supplied the effect of the Barbarians in skill and courage. The battle was longer, and more doubtful, than on any former occasion; many Grecian vessels were destroyed, five were taken by the Egyptians, who particularly signalized themselves on the side of the Barbarians, as the Athenians did on that of the Greeks. The persevering valour of the latter at length prevailed, the enemy retiring, and acknowledging their superiority, by leaving them in possession of the dead and the wreck. But the victory cost them dear; since their vessels, particularly those of the Athenians, were reduced to a very shattered condition; and their great inferiority in the number and size of their ships, made them feel more sensibly every diminution of strength."

(1.) ARTEMISIUM, a town of Oenotria, now called ST AGATHA, in Calabria, on the river Pi-

sauros, or la Foglia, 8 miles distant from the Tuscan Sea.

(3.) ARTEMISIUM, a town of Spain on the sea coast of Valencia, called also DIANIUM, and now DENIA, anciently possessed by the Contestani.

(1.) ARTEMON, the founder of the sect of Artemonites, who flourished about the year 210. See ARTEMONITES.

(2.) ARTEMON, a Syrian who resembled Antiochus, king of Syria, so exactly, that by the contrivance of his queen Laodice, he personated him after his death, and thus obtained the kingdom.

(3.) ARTEMON of Clazomene, the inventor of the battering ram, and the military testudo.

ARTEMONITES, in church history, Christians in the third century, who denied the divinity of Christ, asserting him to have only had a human nature, though divinely sent, and more excellent than the prophets. They seem to have been what we now call UNITARIANS.

ARTEMUS, a promontory of Valencia; called also Cabo St Martin, and Punta del Emperador.

ARTENNA, in ornithology, the name of a water bird, of the size of a hen, of a brownish colour on the back, and white on the belly; having a crooked bill, and its three fore toes connected by a membrane, but the hinder one loose. It is found on the island Tremiti in the Adriatic sea, and is supposed to be the *avis Diomedis* of the ancients.

ARTERIA ASPERA, } &c. See ANATO-
ARTERIA BRONCHIALIS, } MY, INDEX.

ARTERIACA, } Medicines for disorders of the
ARTERIACS. } trachea, and the voice. Arteriacs are reduced by Galen into three kinds: 1. Such as are void of acrimony, serving to mollify the asperities of the part; such as gum tragacanth, *after samius*, starch, milk, &c. 2. Those of an acrimonious quality, whereby they stimulate even the sound parts; such as honey, turpentine, bitter almonds, iris root, &c. 3. Those of an intermediate kind, soft and mild, yet detergent; such as butter, and preparations of almonds, honey, &c.

*ARTERIAL. *adj.* [from *artery*.] That which relates to the artery; that which is contained in the artery.—

Had not the Maker wrought the springy frame,

The blood, defrauded of its nitrous food,

Had cool'd and languish'd in the arterial road.

Blackmore.

As this mixture of blood and chyle passeth thro' the arterial tube, it is pressed by two contrary forces; that of the heart driving it forward against the sides of the tube, and the elastic force of the air, pressing it on the opposite sides of those air-bladders; along the surface of which this arterial tube creeps. *Arbutnot.*

ARTERIA VENOSA, a name given by the ancients to the pulmonary vein, on the erroneous supposition of its being an air vessel, and that it served for the conveyance of the vital aura, from the lungs to the heart.

ARTERIES. See ANATOMY, INDEX.

ARTERIOSA VENA, or ARTERIAL VEIN, a denomination given to the pulmonary artery.

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32. 33.

34. 35.
36. 37.

38. 39.
40. 41.

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48. 49.

50. 51.
52. 53.

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Geoffrey of Monmouth : but the probable is there blended with the marvellous and the extravagant, that not only the truth of the whole, but even the reality of Arthur's existence, has been called in question.

(2.) ARTHUR, EXISTENCE OF, VINDICATED. Mr Whittaker has taken much pains to vindicate the existence, and discriminate between the real and the fabulous transactions, of our British warrior. "Many of the actions (he observes) attributed to Arthur by the Welch chronicles of Britain, are as absurd in themselves as they are spurious in their authority. Written, as those narratives were, many centuries after the facts, and being merely the authentic accounts of Arthur, embellished with the fictions and distorted by the reversions of folly ; they are inconsistent equally with the state of the times, and the history of the continent of the island. And the ignorance of the forgers, and the credulity of their abettors, can be equalled only by the injudiciousness and credulity of the opponents to both. If some accounts of Arthur and Cunobeline in these histories are certainly spurious, others are as certainly genuine. And the relations of Suetonius, Dio, and Tacitus, are not to be rejected, because of the falsehoods which imposture has engrafted upon them, and absurdity admitted with them. The existence of Arthur is evinced by that of the fables, which have at once annihilated his actions and his name in the misjudging critic. And the reasoner's arguments really turn against himself, and demonstrate the point which they were intended to disprove. The annals of Wales have long laboured in Arthur's commendation. The Highlanders have long had a poetical history of his exploits in their own language. The whole island in traditional possession of his character ; and so or 700 places within it are still distinguished by his name. The genuine actions of the chief are mentioned by his own historians, with a modesty and conciseness that is no bad argument of the truth, and with a particularity of time and place that is a good evidence of the facts. They are noted by men, whom the death of the hero had tempted from all temptation to flatter : they are related by persons, whom a proximity to the times had precluded from all possibility of mistake : and they are attested by the best historical authority, writers who lived cotemporary with him, authors who conversed with his warriors, and historians who wrote within a few years after him. He is spoken of as the honourable father of the British heroes by the aged Llomarch, a writer actually cotemporary with him, and some time resident at his court. One of his greater actions is incidentally recorded by Taliesin, an historical bard living under Maelgwn Gwyned, who was a sovereign among the Britons in the days of Arthur, Gildas, and Llomarch. Another of his considerable exploits is casually intimated by Myrddin Wyhit or Merlinus Caledonius, who complains of the severe treatment which he himself received from Rydderch Hael, a king cotemporary with Uther Reged, and engaged with him in a war against the Saxons on the death of Ida in 560. And all his actions are particularly recited by Nennius. In the *Historia Britonum* of this last author, Arthur's

victories over the Saxons are thus recorded. The first battle was fought at the mouth of the river, which is denominated *Glem*. The 2d, 3d, 4th, and 5th, were upon another river called *Duglas*, and lies in the region *Linuis*. The 6th was on a stream, which bears the appellation of *Bassas*. The 7th was in the wood of *Celidon*, that is, in *Cat Coit Celidon*. The 8th was at *Castle Cunnion*. And the 9th was at the city of the *Legion*. The 10th was on the bank of the river *Ribroit* ; the 11th at the hill *Agned Cathregonion* ; and the 12th at *Mount Badon*. These 12 battles of Arthur are described to us in the same manner as *Vortimer's* three. Only the general facts are mentioned, and only the common names of places are recited, in both. And from the whole air and aspect of the history, the remarkable conciseness with which the notices are given, and the great ease with which the places are pointed out, the detail appears to have been drawn up at the distance only of a few years from the transactions, and when these little references were sufficiently understood." Mr Whittaker proceeds to ascertain the scenes of Arthur's battles ; after which he gives a relation of them with a surprising particularity. A severe critic might be apt to say, as Dr Kippis observes, that it requires all our faith in the author's judgment, as well as in his ingenuity and learning, not to suspect that he sometimes allows too much scope to fancy and conjecture. However, the whole of what he hath advanced is singularly curious, and deserves peculiar attention and consideration. And no one can help admiring the penetration with which he hath formed such a regular detail of facts, from the combined aid of history, romance, and tradition. According to Mr Whittaker, Arthur's principal exploits were against the northern Saxons, whilst he was only prince of the *Silures*, and *Ambrosius* was the dictator or pendragon of the Britons. "In a series probably of five campaigns, and in a succession certainly of eleven victories, this great commander had repelled the Saxons from the N. of *Flavia*, dislodged them from all *Maxima*, and dispossessed them of all *Valentia*. And these were successes so unchequered with misfortunes, so great in themselves, and so beneficial to the public, that the name of Arthur claims the first rank in the list of military, and the better one of patriot, heroes." The 12th battle of Arthur was fought in the S. of England, after he was elected to the pendragonship, against *Cerdic* the Saxon. "This (says Mr Whittaker) was a most extraordinary victory, and completes the circle of Arthur's military glories." In the author's account of this prince's conduct in peace, he asserts, that "Arthur saw that an appointment was wanted, which should at once be a more regular and more honourable signature of merit ; by the certainty of the honour and the greatness of the dignity, call out all the worth of all the worthy in the nation ; and collect it round the throne of the pendragon. Accordingly he established a military order. It was the first that had ever been instituted in the island ; and it has since been imitated by all the nations on the continent. By means of this association, Arthur raised among the provincials a general glow of ingenuous heroism, the first spirit of chivalry that ever appeared in En-

that manly and honourable gallantry of soul, which has made him and his worthies the subject of romantic histories over all the west of it. By this, and this alone, could he have been what history represents him, the Revered Father of the British Heroes in general, even to the conclusion of the 6th century, and nearly the middle of the 7th. The order naturally survived its founder. And the members of it were denominated the Warriors of Arthur, though the persons were born half a century after his death." Mr Whittaker goes on to inform us, that, under the prudent management of Arthur for 20 years together, a fair prospect dawned upon the Britons, and long scenes of future glories opened to their imaginations. "But the gay vision was destroyed at once by the commencement of a civil war. Many towns still remained in ruins, the memorial of the former wars, and the disgrace of the present. The diffused spirit of chivalry was turned upon the nation, and heroism became the tool of dissension. And the dreadful combination of civil evils was begun and consummated, at once, by the death of the renowned Arthur in battle. Thus died the incomparable hero in 542."

(3.) ARTHUR, REALITY OF, PROVED. To these observations it may not be improper to add the following account of the discovery of Arthur's tomb, which appears to be tolerably well authenticated. Henry II. the first of the Plantagenet line, being, in the last year of his reign, at Pembroke, and hearing there a Welsh bard singing to his harp the story of Arthur, concluding with an account of his death and burial in the church-yard of Glastenbury between two pyramids; the king instantly gave orders that the matter should be inquired into, and the body dug up. This was done as the king directed; and at the depth of 7 feet was found a vast stone, whereon was fastened a leaden cross, with this inscription on the inside: *Hic Jacet Sepultus Inclitus Rex Arturius in Insula Avalonia*; i. e. "Here lies the famous King Arthur, buried in the Isle of Avalon." Digging still lower, they found the king's body in the trunk of a tree, his beautiful queen lying by him, with long flowing hair, in colour bright as gold, which however sunk into dust when touched. The king's bones were very large sized; and in his skull there were ten wounds or more, all cicatrized, except that of which he died. This discovery was made in the year 1189, as Giraldus Cambrensis tells us, who saw these bones, and examined the whole matter carefully. There was also a table containing this story, set up in the monastery of Glastenbury, and the leaden cross with the inscription remained there till the dissolution of the monastery, where it was seen by the great antiquary Leland, but what is become of it since does not appear. Of the different places above alluded to, as being distinguished by our hero's name, and serving to evince his existence, one of the principal, is ARTHUR'S SEAT, which see.

(4.) ARTHUR, SUMMARY ACCOUNT OF. To the above accounts of this British hero, it is proper to add, that Rapin represents him to have been much earlier, than the year 501. He says that he was born in Cornwall, in 452 or 453;

he succeeded his father as king of Danmonium, in 467; was created patrician by Aurelius Ambrosius, in 476; elected king of Britain in 501; resumed the imperial purple in 528, and was mortally wounded in battle, in 542, when Mordred and he meeting, they rushed upon each other with the utmost impetuosity. Mordred was killed upon the spot, but Arthur was carried to Glastenbury, where he died, aged 90, of which long period he had spent 76 years in fighting the enemies of his country.

(II.) ARTHUR, prince of Scotland, the son of king Aidan, was slain in battle fighting against the Picts, about A. D. 600.

(III.) ARTHUR, prince of Wales, eldest son of king Henry VII. died before his father, in 1502, aged 17, 5 months after his marriage with the princess Catharine of Arragon.

ARTHURET, a village in Cumberland, S. of Longtown, near the river Kirkcubright.

ARTHUR'S CASTLE, a small town in Cornwall, on the coast, near Tintagel and Boscastle.

ARTHUR'S HALL, a village in Cornwall, near Penpont and Temple-Moors.

ARTHUR'S OVEN, an ancient ruin in Stirling-shire, near the Carron Works, called by Buchanan *Templum Termini*.

ARTHUR'S SEAT, a high hill in the neighbourhood of Edinburgh, said to have been so denominated from a tradition that king Arthur surveyed the country from its summit, and had also defeated the Saxons in its neighbourhood. This hill rises by a steep and rugged ascent, till it terminates in a rocky point near 700 feet high from the base, being more than double the height of the cross on the top of St Paul's, London, which is 340 feet. On the S. it is in many parts a perpendicular rock, composed of basaltic pillars, regularly pentagonal or hexagonal, about three feet in diameter, and from 40 to 50 feet in height. Contiguous, upon the W. and partly connected with it at the base, are Salisbury craggs, of immense height, but exhibiting an appearance equally singular and grand. They present to the city a awful front of broken rocks and precipices, forming a sort of natural amphitheatre of solid rock, and backward from the craggy verge above, the hill forms an extensive irregular slope, the surface affording pasture to numerous flocks of sheep. The craggs, beside ores, spars, rock-plants, &c. here and there it is said some precious stones, afford an inexhaustible supply of granite for paving the streets, &c. In quarrying, a part of the crag has been worn down into a spacious shelf, having the appearance of a lofty terrace, and stretching a considerable length. From hence is a near and distinct prospect of the city with its environs, and the adjacent country. But from the pinnacle called Arthur's Seat the view is more noble and extensive. The traveller may here sit and survey at his ease the centre of the kingdom, besides having a complete view of Edinburgh and its castle, on which he looks down as if seated among the clouds. In a word, the German ocean, the whole course of the Forth, the distant Grampians, and a large portion of the most populous and best cultivated part of Scotland, from a landscape sublime, various, and beautiful. The denomination of the hill

hill, derived as above, has been adduced as an argument against those who dispute the existence of the British Arthur. That derivation, however, though probable, is not without uncertainty. For *Arthur's Seat* is said to be derived, or rather corrupted, from *Ard Seir*, a "place or field of arrows," where people shot at a mark: And this not improperly; for among these cliffs is a dell or secluded valley, where the wind can scarcely reach, now called the *Hunter's bog*, the bottom of it being a morass. The adjacent craggs are supposed to have taken their name from the Earl of Salisbury, who, in the reign of Edward III, accompanied that prince in an expedition against the Scots: though, according to others, the genuine derivation, like that of *Arthur's Seat*, is from a Celtic word also corrupted.

(1.) * **ARTICHOKE.** *n. f.* [*artichault*, Fr.] This plant is very like the thistle, but hath large scaly heads shaped like the cone of the pine tree; the bottom of each scale, as also at the bottom of the petals, is a thick fleshy eatable substance. *Miller.* No herbs have curled leaves, but cabbage and cabbage lettuce; none have double leaves, one growing to the stalk, another to the fruit or seed, it the *artichoke*. *Bacon.*—*Artichokes* contain a rich, nutritious, stimulating juice. *Arbutnot on* *aments.*

(2.) **ARTICHOKE**, in botany. See **CINARA.**

(3.) * **ARTICHOKE OF JERUSALEM.** A species of sun flower.

* **ARTICK.** *adj.* [it should be written *artick*, from *arctic*.] Northern; under the bear. See **ARCTIC.**—But they would have winters like those beyond the *artick* circle; for the sun would be 80 degrees from them. *Brown.*—In the following example it is, contrary to custom, spelt after the French manner, and accented on the last syllable.—

To you, who live in chill degree,
As map informs, of fifty-three,
And do not much for cold atone,
By bringing thither fifty-one,
Methinks all climes should be alike,
From tropick e'en to pole *artique*. *Dryden.*

(1.) * **ARTICLE.** *n. f.* [*articulus*, Lat.] 1. A part of speech, as, *the*, *an*; *the* man, *an* ox. 2. A single clause of an account; a particular part of any complex thing.—Laws touching matters of order, or changeable by the power of the church; *articles* concerning doctrine not so. *Hooker.*—

Have the summary of all our griefs,
When time shall serve to shew in *articles*. *Shakesp.*
Many believe the *article* of remission of sins, but believe it without the condition of repentance. We believe the *article* otherwise than God intended it. *Taylor's Holy Living.*—All the precepts, promises, and threatenings of the gospel will rise up in judgment against us; and the *articles* of our faith will be so many *articles* of accusation; and the great weight of our charge will be this, That we did not obey the gospel which we professed to believe; that we made confession of the christian faith, but lived like heathens. *Tillotson.*—You have small reason to repine upon that *article* of life. *Swift.* 3. Terms; stipulations.—I embrace these conditions; let us have *articles* been us. *Shakesp.*
It would have gall'd his surly nature;

Which easily endures not *article*,

Tying him to aught.

Shakespeare.

4. Point of time; exact time.—If Cansfield had not, in that *article* of time, given them that brisk charge, by which other troops were ready, the king himself had been in danger. *Clarendon.*

(2.) **ARTICLE**, **ARTICULUS**, in anatomy, a joint, or juncture, of two or more bones of the body.

(3.) **ARTICLE**, in arithmetic, signifies the number 10, or any number justly divisible into ten parts, as 20, 30, 40, &c.

(4.) **ARTICLE**, in grammar, denotes a particle used in most languages for the declining of nouns, and denoting the several cases and genders thereof. The use of articles arises chiefly hence, that in languages which have no different terminations, to express the different states and circumstances of nouns, there is something required to supply that office. The Latins have no articles; but the Greeks, and most of the modern languages, have had recourse to them, for fixing and ascertaining the vague signification of common and appellative names. The Greeks have their *ο*, the eastern tongues their *be emphaticum*; the Italians their *il*, *lo*, and *la*. The French their *le*, *la*, and *les*. The Germans their *der*, *das*, *dat*. The English also have 3 articles, *a*, *an*, and *the*; which, being prefixed to substantives, apply their general signification to some particular things. Some grammarians make the article a distinct part of speech; others will have it a pronoun, and others a noun-adjective. See **GRAMMAR.** Articles are of great service in a language, as they contribute to the more neat and precise expressing of several properties and relations, which must otherwise be lost. And hence one great advantage of such languages over the Latin, in that the article being either expressed or left out, makes an alteration in the sense, which the Latins cannot distinguish. Thus when the devil said to our Saviour, *Si tu es Filius Dei*, it may either be understood, "if thou art a son of God;" or, "if thou art *the* son of God." The Italians even prefix articles to proper names, which do not naturally need any, because they themselves signify things individually. Thus they say, *il Ariosto*, *il Tasso*, *il Petrarca*. Even the French join the article to the proper names of kingdoms, provinces, &c. as *la Suede*, *la Normandie*. And we likewise annex it to the names of certain mountains and rivers; as *The Rhine*, *The Danube*, *The Alps*, &c. The articles are divided into *definite* and *indefinite*.

1. **ARTICLE**, **DEFINITE.** The article, *the*, is said to be *definite*, or *demonstrative*, as fixing the sense of the word it is put before, to one individual thing. *The* respects our secondary preception, and denotes individuals as known.

2. **ARTICLE**, **INDEFINITE.** The articles, *a* and *an*, are said to be *indefinite*, because applied to names taken in their general signification; as, he travelled with the port and equipage of *a* prince or *an* emperor, where the words, *a* prince, or *an* emperor may be understood of any such person. *A* or *an* respects our primary perception, and denotes individuals, as unknown.

(5.) **ARTICLE**, in literary composition, a small part or division of a discourse, book, or writing, &c.

41

LETTER
TO THE
JURY
IN THE
CASE OF
THE
MISSISSIPPI
RIOTS
OF 1892
BY
J. M. WILSON
OF THE
FEDERAL BUREAU OF INVESTIGATION
U. S. DEPARTMENT OF JUSTICE
WASHINGTON, D. C.
1893

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into nodes or joints, and which usually send forth branches.

(4.) ARTICULATION, in grammar, a distinct pronunciation of words and syllables.

ARTICULUS. See ARTICLE.

* ARTIFICE: *n. f.* [*artificium*, Lat.] 1. Trick; fraud; stratagem.—It needs no legends, no service in an unknown tongue; none of all these laborious artifices of ignorance; none of all these cloaks and coverings. *South.* 2. Art; trade; skill obtained by science or practice.

(1.) * ARTIFICER. *n. f.* [*artifex*, Lat.] 1. An artist; a manufacturer; one by whom any thing is made.—The lights, doors, and stairs, rather directed to the use of the guest, than to the eye of the artificer. *Sidney.*—The great artificer would be more than ordinarily exact in drawing his own picture. *South.*—In the practices of artificers, and the manufactures of several kinds, the end being proposed, we find out ways. *Locke.* 2. A forger; contriver.—

He soon aware;

Each perturbation smooth'd with outward calm,
Artificer of fraud! and was the first
That practis'd falsehood under faintly shew.

Milton.

Th' artificer of lies

Renews th' assault, and his last batt'ry tries.

Dryden.

A dexterous or artful fellow: not in use.—

Let you alone, cunning artificer. *Ben Jonson.*

(1.) ARTIFICERS, among the Romans, had their peculiar temples, where they assembled and chose their own patron, or advocate, to defend their cause; they were exempted from all personal services. Taruntenus Paternus reckons 32 species of artificers, and Constantine 35, who enjoyed a privilege. The artificers were incorporated into divers colleges or companies, each of which had their tutelary gods, whom they worshipped. Several of these, when they quitted their profession, gave up their tools, a votive offering to their gods. Artificers were held a degree below merchants, and *argentarii* or money changers, and their employment more sordid. Some deny, that at the earliest ages of the Roman state, artificers were ranked in the number of citizens; others, to assert their citizenship, allow that they were held in contempt, as being unfit for war, and so that they could scarce pay any taxes. For such reason they were not entered among the citizens in the censor's books; the design of the census being only to see what number of persons were yearly fit to bear arms, and to pay taxes towards the support of the state. It may be added, that much of the artificers' business was done by slaves and foreigners, who left little for the Romans to mind but their husbandry and war. In almost all ages, till the present, and under most forms of government, artificers have been too little respected. By means of the arts, the minds of men are engaged in inventions beneficial to the whole community; and thus prove the grand preventive against that barbarism and brutality, which ever attend indolence and induce stupidity. Mazzini has a treatise on the diseases of artificers.

(2.) ARTIFICERS, LAWS RESPECTING. By the English laws, artificers in wool, iron, steel, brass,

VOL. II. PART II.

or other metal, going out of the kingdom into any foreign country without licence, are to be imprisoned three months, and fined in a sum not exceeding 100*l.* And such as go abroad, and do not return on warning given by our ambassadors, &c. shall be disabled from holding lands by descent or devise, from receiving any legacy, &c. and be deemed aliens, Stat. 5. Geo. I. cap. 27. By 23 Geo. II. cap. 13. § 1. Penalty is also inflicted on seducing artificers to go abroad.

(1.) * ARTIFICIAL. *adj.* [*artificiel*, Fr.] 1. Made by art; not natural.—Basilus used the artificial day of torches to lighten the sports their inventions could contrive. *Sidney.*—

The curtains closely drawn the light to screen,
As if he had contriv'd to lie unseen:

Thus cover'd with an artificial night,

Sleep did his office.

Dryden.

There is no natural motion perpetual; yet it doth not hinder but that it is possible to contrive such an artificial revolution. *Wilkins.* 2. Fictitious; not genuine.—

Why, I can smile, and murder while I smile,
And cry, Content, to that which grieves my heart,

And wet my cheeks with artificial tears. *Shakespeare.*

The resolution which we cannot reconcile to public good, has been supported by an obsequious party, and then with usual methods confirmed by an artificial majority. *Swift.* 3. Artful; contrived with skill.—These seem to be more artificial, as those of a single person the more natural governments. *Temple.*

(2.) ARTIFICIAL is also frequently used for FACITIOUS. Thus we have artificial sal ammoniac, artificial borax, &c.

(3.) * ARTIFICIAL ARGUMENTS. [In rhetoric.] Are proofs on considerations which arise from the genius, industry, or invention of the orator; which are thus called, to distinguish them from laws, authorities, citations, and the like, which are said to be *inartificial* arguments.

(4.) ARTIFICIAL DAY, the time between the sun's rising and setting, in any position of the hemisphere.

(5.) ARTIFICIAL FIRE-WORKS are compositions of inflammable materials, chiefly used on public occasions, by way of rejoicing. See PYROTECHNY.

(6.) ARTIFICIAL LIGHTNING. See ELECTRICITY and LIGHTNING.

(7.) * ARTIFICIAL LINES, on a sector or scale, are lines so contrived as to represent the logarithmick lines and tangents; which, by the help of the line of numbers, solve, with tolerable exactness, questions in trigonometry, navigation, &c. *Chambers.*

(8.) ARTIFICIAL MAGNETS. See MAGNETS.

(9.) ARTIFICIAL MUSIC, that which is according to the rules of art; or executed by instruments invented by art. It is also used, in another sense, for some artful contrivance in music; as when a piece is sung in two parts; one whereof is by B molle, or flat, and the other by B sharp.

(10.) * ARTIFICIAL NUMBERS, are the same with logarithms.

* ARTIFICIALLY. *adv.* [from *artificial*.] 1. Artfully; with skill; with good contrivance.—How cunningly he made his faultiness less, how

D d d d

artificially

artificially he set out the torments of his own conscience. *Sidney*.—Should any one be cast upon a desolate island, and find there a palace *artificially* contrived, and curiously adorned. *Ray*. 2. By art; not naturally.—It is covered on all sides with earth, crumbled into powder, as if it had been *artificially* sifted. *Addison*.

* **ARTIFICIALNESS**. *n. s.* [from *artificial*.] Artfulness. *Diſt.*

* **ARTIFICIOUS**. *adj.* [from *artifice*.] The same with *artificial*.

ARTIGI, or } a town of the Turduli, in Ba-
ARTIGIS, } tica, now called ALHAMA.

* **ARTILLERY**. *n. s.* *It has no plural.* [*artillerie*, Fr.] 1. Weapons of war; always used of missile weapons.—And Jonathan gave his *artillery* unto his lad, and said unto him, Go, carry them unto the city. 1 *Samuel*. 2. Cannon; great ordnance.—

Have I not heard great ordnance in the field?
And heav'n's *artillery* thunder in the skies?

Shakespeare.

I'll to the Tower with all the haste I can,
To view th' *artillery* and ammunition. *Shakeſp.*
Upon one wing the *artillery* was drawn, being sixteen pieces, every piece having pioneers to plain the ways. *Hayward*.—

He that views a fort to take it,
Plants his *artillery* 'gainst the weakest place.

Denham.

(2.) **ARTILLERY**, ADDITIONAL DEFINITIONS OF. Artillery in its general sense, denotes, 1. the offensive apparatus of war, particularly of the missile kind. Among the French the term was anciently appropriated to **ARCHERY**: (See § 1; 3 and 5.) In its modern signification it signifies fire-arms, mounted on their carriages and ready for action, with their balls, bombs, grenades, &c. 2. In a more extensive meaning, it includes the powder, the matches, instruments for fire works, the utensils of ordnance, the means which facilitate their motion and transport them, the vehicles over which they traverse rivers, every thing necessary to them, and all that enters into the form of a train of artillery. 3. In a sense still more extensive, the word likewise comprehends the men destined for the service of the *artillery*; the people who provide the artillery with materials and implements when engaged, the cannoniers, the bombardiers, the officers of every rank, and engineers of every kind. 4. By the term *artillery* is likewise understood the science which the officers of artillery ought to possess. This science teaches to know the nature of all the materials and ingredients which enter into the composition and the structure of every thing relative to the artillery, such as nitre, sulphur, charcoal; the properties of air and fire; the composition and preparation of gun-powder; the materials for fire-works; the construction, proportions, &c. for the different warlike machines; the arrangement, movement, and whole management, of cannon, &c. in the field or in sieges, in such a manner, that each of them, according to the length of its tube and the diameter of its bore, may be situated in the best place and at the properest distance for execution, and that the whole train taken together may reci-

procally assist and support each other with the greatest advantage.

(3.) **ARTILLERY**, ANCIENT. Artillery has undergone many changes from its origin to the present time. The artillery of the ancients were the catapultæ, the balistæ, the different kinds of slings, &c. In latter ages, the Franks used the hatchet as a missile weapon, throwing it in the same manner as the Americans do the *tomahawk*. The Gaseons and Genoese were excellent cross bow men. The Swiss owed their victories to their strength and skill in the use of the pike, halberd, and espadon or two handed sword; and the victories of Cressy, Poitiers, and Agincourt, will occasion the valour and skill of the English archers to be transmitted down to the latest posterity. See **ARCHERY**, § 3, and 4. The chevalier Foix was extremely attached to the ancient machine first mentioned, and seemed even to prefer them to our fire arms: an opinion which must appear not a little extraordinary from such a period.—Father Daniel might well be mistaken in the comparison which he made between the effects of ancient and modern artillery, and in his conclusion, that the latter was of little use: the situation of this good father removed him from the scene of war, and the opportunities of military experience. But it is astonishing, that one so learned in the military art as the commentator of Polybius, who had ocular demonstration of the force of modern artillery, should have declared so violently against it. Whatever be the case with the authors and their maxims, it may be asserted, that cannon is one of the most singular discoveries which have been made amongst men; and little and little, it has changed the whole art of war, and of consequence, the whole system of policy, in Europe. The æra of artillery is dated from the battle of Cressy in 1346, because it is only from that day that cannons were mentioned in battle. Edward III. of England successfully employed some pieces of artillery placed in the front of his army. The invention of artillery was then known in France, as well in England; but probably Philip VI. marched with so much hurry and precipitation to attack his enemy, that he left his cannon as useless cumbrances behind him. The ignorance of the age in mechanical arts, considerably retarded the progress of artillery; and that of which they were then possessed, was so unwieldy and imperfect, that they could not possibly discern its importance and efficacy in practice.

(4.) **ARTILLERY**, MODERN, HISTORY OF. After the invention of gun powder, the Spaniards were the first who armed part of their foot with muskets and harquebusses, and mixed them with the pikes. In this they were soon imitated by other nations; though the English had not entirely laid aside their favourite weapon the long bow, and generally taken to the use of fire arms, during the reign of queen Elizabeth. The muskets were very heavy, and could not be fired without a rest: they had matchlocks, and bore of a wide bore, that carried a large ball and charge of powder, and did execution at a great distance. The musketeers on a march carried

ly their rests and ammunition, and had boys to bear their muskets after them, for which they were allowed great additional pay. They were very slow in loading, not only by reason of the unwieldiness of the pieces, and because they carried the powder and balls separate, but from the time it took to prepare and adjust the match; so that their fire was not near so brisk as ours is now. Afterwards a lighter kind of matchlock musket came into use; and they carried their ammunition in bandeliers, which were broad belts that came over the shoulder, to which were hung several little cases of wood, covered with leather, each containing a charge of powder; the balls they carried loose in a pouch, and they had also a priming horn hanging by their side. Matchlocks were, about the beginning of this century, universally disused in Europe, and the troops were armed with firelocks; to which, much about the same time, the bayonet being added, pikes also were laid aside; which latter change, whether it was for the better or not, is a point that still admits of dispute among the best military writers, who are divided in their opinions about it, tho' most of them disapprove of it. The old English writers call those large muskets *calivers*; the harquebuss was a lighter piece, that could be fired without a rest. The matchlock was fired by a match, fixed by a kind of tongs in the serpentine cock, which, by pulling the trigger, was brought down with great quickness upon the priming in the pan, over which there was a sliding cover, which was drawn back by the hand, at the time of firing. There was a great deal of nicety and care required to fit the match properly to the cock, so as to come down exactly upon the priming, to blow the ashes from the cock, and to guard the pan from the sparks that fell from it: a great deal of time was lost in taking it out of the cock, and returning it between the fingers of the left hand, every time that the piece was fired; and wet weather often rendered the matches useless. However, most writers allow that they were very sure, and less apt to misfire, than the firelock. The firelock is so called, from producing fire of itself, by the action of the iron and steel. The most ancient invention of this sort is the wheel lock, which we find mentioned in Luigi Collado's Treatise of Artillery, printed at Venice, 1586, as then lately invented in Germany. This sort of lock was used till within these hundred years, especially for pistols and carbines. It was composed of a solid steel wheel, with an axis, to which was fastened a hammer, which, by being round it, drew up a very strong spring; on pulling the trigger, the spring striking, whirled the wheel about with great velocity, and the friction of the edge of it (which was a little notched) against the stone, produced the fire: the cock was made so as to bring the hammer upon the edge of the wheel, part of which was in the pan, and touched the priming; they used any common hard pebble for that purpose, which served as well as flint. These locks were inconvenient, took time to wind up (or span, as they termed it), and sometimes would not go off; an instance of which may be seen in Ludlow's Memoirs. When the firelock, such as we now

use, was invented, we cannot ascertain: it is called, by writers of about the middle of the last century, a *snaphane*, or *snaphance*; which being the Dutch word for a *firelock*, seems to indicate, that it is a Dutch invention, and that we took it from them. But Ward, in his Animadversions of War, (printed in 1639, p. 502,) after describing the exercise of the firelock, pistol, and carbine, (by which he means the wheel lock), says that as most of our pieces go with English locks, which differ from firelocks, he shall add the method of handling them; and then gives the exercise of the snaphane carbine; by which it appears, that there was little or no difference between that and the pieces now in use. The more modern writers call it a *fusée*, from the French word *fusil*; whence the name of fusileers is still continued to several of our regiments, which were the first that were armed with them on the disuse of matchlocks. They used the musket and rest in England, so late as the beginning of the civil wars, as may be seen in Col. Bariffe's Young Artillery Man, printed at London, 1643. Figuerra, in his embassy in 1518, relates, that the Persians would neither make use of infantry nor of artillery, because by them the impetuosity of attack, and the facility of retreat were equally incumbered and retarded: in these expedients alone, their address and their glory consisted.— This method of advancing and recalling is widely different from the present conduct of war, as the artillery in armies is now prodigiously multiplied, and must be transported to every place where any body of troops whatever is destined to operate. The length and diameter of cannon has been much diminished, which must likewise proportionably diminish their weight. It is by long practice and experience, that they have discovered how much might be deducted from their magnitude in both respects with propriety, without hurting the grand effects which, on some occasions, it is necessary they should produce, by rendering them more easy to be wielded, which was the advantage pursued by lessening their size. See CANNON, GUNNERY, and PROJECTILES. Improvements, however, are still making, and will probably long continue to be made, in these ignominious machines, that mock the thunder, which, though they seem to be invented for the destruction of the human race, and the subversion of empires, have yet by their effects rendered war less savage and less sanguine; political alliances have been more successfully conciliated among all nations, conquests are become less frequent, and less rapid, and successes in war have been more easily reduced to calculation.

(5.) ARTILLERY, MODERN, IMPORTANT CHANGES PRODUCED BY. The change introduced in the military art by the modern artillery, Dr Smith observes, has enhanced greatly both the expence of exercising and disciplining any particular number of soldiers in time of peace, and that of employing them in time of war. Both their arms and their ammunition are become more expensive. A musket is a more expensive machine than a javelin or a bow and arrows; a cannon or a mortar, than a balista or a catapulta. The powder which is spent in a modern review, is lost irrecoverably

verably, and occasions a very considerable expence. The javelins and arrows which were thrown or shot in an ancient one, could easily be picked up again, and were besides of very little value. The cannon and the mortar are not only much dearer, but much heavier machines than the balista or catapulta, and require a greater expence, not only to prepare them for the field, but to carry them to it. As the superiority of the modern artillery too over that of the ancients is very great, it has become much more difficult, and consequently, much more expensive, to fortify a town, so as to resist, even for a few weeks, the attack of that superior artillery. In modern war, the great expence of fire arms gives an evident advantage to the nation which can best afford that expence; and consequently, to an opulent and civilized, over a poor and barbarous nation. In ancient times, the opulent and civilized found it difficult to defend themselves against the poor and barbarous nations. In modern times, the poor and barbarous find it difficult to defend themselves against the opulent and civilized. The invention of fire arms, an invention, which at first sight appears to be so pernicious, is certainly favourable both to the permanency and to the extension of civilization. It has to many appeared matter of surprise, that the battles of the ancients should be described with an order, perspicuity, and circumstantial minuteness, which are not to be found in the military writers of modern times. Scholars have endeavoured to explain this difference, by observing the disproportion, in point of dignity and abilities, between the military historians of modern Europe, and those of Greece and Rome. But the difficulty will be better solved, Dr Gillies thinks, by reflecting on the changes introduced into the art of war, by the change of artillery; which, in military operations, form the pivot on which the whole turns. 1. From the nature of fire arms, modern battles are involved in smoke and confusion. 2. From the same cause, modern armies occupy a much greater extent of ground, and begin to act at much greater distances; which renders it more difficult to observe and ascertain their manœuvres. 3. The immense train of artillery, ammunition, &c. required in the practice of modern war, gives a certain immobility to our armies, which renders it impossible to perform, without great danger, those rapid evolutions in fight of an enemy, which so often decided the battles of the ancients. With us, almost every thing depends on the judicious choice of ground, a matter requiring great military genius, but not admitting the embellishments of historical description. In the battles of the Greeks and Romans, the extraordinary disproportion between the numbers slain on the side of the victors and the vanquished, has been observed as another remarkable circumstance. But this necessarily resulted from the nature of their arms. Their principal weapons not being missile, but manual, armies could not begin to act, till they had approached so nearly to each other, that the conquered found themselves cut off from all possibility of retreat. In modern times, such consequences seldom take place. The use of fire arms (which often renders the action itself

more bloody,) furnishes the defeated party with various means of retreating, with considerable safety. The sphere of military action is so widely extended in modern times, that before the victors can run over the space which separates them from the vanquished, the latter may fall back, and proceed with little loss beyond their reach; and should any village, hedge, ravine, &c. be found in their way, may often check the ardour of the pursuers. Upon these considerations, the invention of gun powder and modern artillery may be said to have saved the effusion of human blood. Equestrian engagements (the principle on which cavalry act, being nearly the same in every age) are still similar in circumstances to those which appear so extraordinary in the battles of antiquity. Before we conclude this article, several terms relative to the artillery, require to be explained: such as

1. ARTILLERY COMPANY, a band of infantry consisting of 600 men, making part of the militia or city guard of London.

2. ARTILLERY GUARD is a detachment from the army, to secure the artillery. This corps is in the front, and the sentries are round the park. Upon a march, they go in the front and rear of the artillery, and must be sure to leave none behind. If a gun or waggon break down, the captain is to leave a part of his guard, to assist the gunners and matrosses in getting it up again.

3. ARTILLERY PARK, the place in the rear of both lines in the army, for encamping the artillery, which is drawn up in lines, of which the first is formed by the guns; the ammunition waggons make two or three lines, 60 paces behind the guns, and 30 distant from one another: the pontoons and tumbrils make the last line. The park is surrounded with a rope which forms the park, the gunners and matrosses encamp on the flanks, and the bombardiers, pontoon-men, and artificers, in the rear.

4. ARTILLERY TRAIN, a certain number of pieces of ordnance mounted on carriages, with their furniture fit for marching.

ARTINGTON, a village in Surry, near Colchester, famous for its alms.

* ARTISAN. *n. f.* [French.] 1. Artificer; provider of an art.—What are the most judicious artificers, but the mimicks of nature. *Watson's Art and Mystery.*

Best and happiest artisan,
Best of painters, if you can,
With your many-colour'd art,
Draw the mistress of my heart. *Garland*

2. Manufacturer; slow tradesman.—I who have none but generals to oppose me, must have an artisan for my antagonist. *Addison.*

ARTISCUS, [from *arctos*, bread,] in medicine denotes a troche, but more particularly that prepared of viper's flesh, mixed up with bread, to be used in the composition of Venice treacle.—These are more particularly called *artificia trochis*, or theriacal troches. They were formerly in great vogue, and brought with much parade from Venice; but Zwelfer discovered their vanity, since which time, viper's powder has been generally substituted for them, in the preparation of the treacle.

(1.) * **ARTIST**. *n. f.* [*artiste*, Fr.] 1. The pro-
fessor of an art, generally of an art manual.—

How to build ships, and dreadful ordnance
cast,
Instruct the *artists*, and reward their haste.

Waller.

Rich with the spoils of many a conquer'd
land,

All arts and *artists* Theseus could command,
Who sold for hire, or wrought for better fame;
The master painters and the carvers came.

Dryden.

When I made this, an *artist* undertook to imi-
tate; but using another way fell much short.
Opticks. 2. A skilful man; not a no-
tary.—If any one thinks himself an *artist* at this,
him number up the parts of his child's body.
ke.

1.) **ARTIST** is defined by Mr Harris to be, "A
man possessing an habitual power of becoming
cause of some effect, according to a system of
rules and well approved precepts." See **ART**,
& 2. We are told of a privilege granted at Vi-
enna to artists, like the benefit of clergy in Eng-
land; in virtue whereof, criminals adjudged to
die save their lives if they can prove themselves
most consummate workmen in any useful art.
A benefit is allowed them *in favorem artis*, for
first offence, except in some particular crimes,
which coining is one; for here the greater the
talent, the more dangerous the person.

2.) **ARTIST**, in an academical sense, denotes a
professor, or proficient in the faculty of arts.
In the early ages of universities, the 7 liberal arts
completed the whole course of study, or philoso-
phy, as it was called: whence the masters of this
faculty were denominated *Artists*. These were
pages, rhetoric, logic, arithmetic, music, geo-
metry, and astronomy; all which they comple-
ted in the following Latin verse:

*Gramma, Tropus, Ratio, Numerus, Tonus, Angu-
lus, Astrum.*

3.) **ARTIST**, is more peculiarly used, by Pa-
racelsus, for a magician, or other adepts, for a
magician or alchemist:—We find frequent men-
tion in authors of this class, of Elias Artista; or
the artist, who is to come some time before
the dissolution of the world, and restore and make
perfect all arts and sciences, but especially the
making art; and usher in a truly golden age;
millennium! The lower and meaner things in
the sublime art, Paracelsus observes, God has
already discovered; but for the
higher and more important matters, as the trans-
mutation of other metals into gold, they are re-
ferred to the coming of Elias the artist!

ARTIZOOS, [from *αἰς*, short, and *ζωή*, life,]
used by some ancient physicians for an infant
ill-lived, by reason of a difficult birth, where-
in it was long detained in the passage from the
mother.

ARTLEBOROUGH, a village in Northamp-
shire, near Higham-Ferrers.

ARTLESLEY. *adv.* [from *artless*.] 1. In an
artless manner; without skill. 2. Naturally; sin-
cerely; without craft.—Nature and truth, though
so low or vulgar, are yet pleasing when o-
f them and *artlessly* represented. *Pope*.

* **ARTLESS**. *adj.* [from *art* and *less*.] 1. Un-
skilful; wanting art: sometimes with the particle
of.—

The high-shoo'd plowman, should he quit
the land,

Artless of stars, and of the moving sand. *Dryd.*
2. Without fraud; as, an *artless* maid. 3. Con-
trived without skill; as, an *artless* tale.

ARTOBRIGIA, an ancient town of Vindelicia,
now called *Altzburg*, in Bavaria, on the Danube,
below Ingolstadt; according to Aventinus; but
Cluverius supposes it to be *Leberau*, on the Saltz-
bach, below Lauffen, in the archbishopric of Saltz-
burg.

(1.) **ARTOCARPUS**, [from *αἶσος*, bread, and
καρπος, fruit,] the BREAD-FRUIT TREE: A genus
of the monandria order, belonging to the monœ-
cia class of plants. It has a cylindric amentum
or catkin, which thickens gradually, and is cover-
ed with flowers; the male and female in a differ-
ent amentum. In the male, the calyx is two-val-
ved, and the corolla is wanting. In the female,
there is no calyx nor corolla; the stylus is one,
and the drupa is many-celled.

(2.) **ARTOCARPUS**, DESCRIPTIONS OF THE.
Though this tree has been mentioned by many
voyagers, particularly by Dampier, by Rumphius,
and by Lord Anson, yet very little notice
seems to have been taken of it, till the return of
Captain Wallis from the South Seas, and since
that time by others, who have touched at Ota-
heite, and some countries in the East Indies. Cap-
tain Dampier relates, that in Guam, one of the
Ladronie islands, "there is a certain fruit called
the *bread fruit*, growing on a tree as big as our
large apple trees, with dark leaves. The fruit is
round, and grows on the boughs like apples, of
the bigness of a good penny loaf: when ripe, it
turns yellow, soft, and sweet; but the natives
take it green, and bake it in an oven till the rind
is black: this they scrape off, and eat the inside,
which is soft and white, like the inside of new-
baked bread, having neither seed nor stone; but
if it is kept above 24 hours it is harsh. As this
fruit is in season 8 months in the year, the natives
feed upon no other sort of bread during that time.
They told us that all the Ladronie islands had plen-
ty of it. I never heard of it in any other place."
RUMPHIUS, after describing the tree, observes,
that "the fruit is shaped like a heart, and increas-
es to the size of a child's head. Its surface or
rind is thick, green, and covered every where
with warts of a quadrangular or hexagonal figure,
like cut diamonds, but without points. The
more flat and smooth these warts are, the fewer
seeds are contained in the fruit, and the greater
is the quantity of pith, and that of a more gluti-
nous nature. The internal part of the rind, or
peel, consists of a fleshy substance, full of twisted
fibres, which have the appearance of fine wool;
these adhere to, and in some measure form it.—
The fleshy part of this fruit becomes softer to-
wards the middle, where there is a small cavity
formed without any nuts or seeds, except in one
species, which has but a small number, and this
sort is not good unless it is baked, or prepared
some other way: but if the outward rind be ta-
ken off, and the fibrous flesh dried and afterwards
boiled

Boiled with meat as we do cabbage, it has then the taste of artichoke bottoms. The inhabitants of Amboyna dress it in the liquor of cocoa-nuts: but they prefer it roasted on coals till the outward part or peel is burnt. They afterwards cut it into pieces, and eat it with the milk of the cocoa-nut. Some people make fritters of it, or fry it in oil; and others, as the Sumatrians, dry the internal soft part, and keep it to use instead of bread with other food. It affords a great deal of nourishment, and is very satisfying, therefore proper for hard working people; and being of a gentle astringent quality, is good for persons of a laxative habit of body. It is more nourishing boiled in our manner with fat meat than roasted on coals. The milky juice which distils from the trunk, boiled with the cocoa-nut oil, makes a very strong bird-lime. This tree is to be found on the eastern parts of Sumatra, and in the Malay language is called *foccus* and *focum capas*. It grows likewise about the town of Bantam in Java, and in Balaga and Madura, and is known there by the name of *focum*." In ANSON's voyage we are informed,

“that the rima, or bread-fruit tree, is common in all the Ladone islands and some of the Philippines. It is somewhat larger than our apple tree, and bears a broad dark-coloured leaf with five indentures on each side. The fruit hangs on boughs like apples; and is of the size of a penny loaf, with a thick tough rind, which when full ripe turns yellow. The natives gather it before it is quite ripe, and bake it till the crust is pretty black; then they rasp it, and there remains a pretty loaf, with a tender yellow crust, and the crumb of it is soft and sweet as a new baked roll: it is without any seeds or stones. This fruit the inhabitants enjoy for about 7 months; during which they never eat any other kind of bread: but they are obliged to bake it every day; for when it grows a little stale, it becomes harsh and husky, somewhat like the potatoe-bread made in the west of England. There is, however, a remedy for this; which is cutting the loaf into slices when it is new, and drying it in the sun, by which it is changed into the pleasantest rusk that can be eaten.” Capt. COOK, in his voyage, observes, that this fruit not only serves as a substitute for bread among the inhabitants of Otaheite and the neighbouring islands, but also, variously dressed, composes the principal part of their food. It grows on a tree that is about the size of a middling oak; its leaves are frequently a foot and an half long, of an oblong shape, deeply sinuated like those of the fig-tree, which they resemble in colour and consistence, and in the exuding of a milky juice upon being broken. The fruit is about the size and shape of a new-born child's head; and the surface is reticulated, (see Plate XIV.) not much unlike a truffle; it is covered with a thin skin, and has a core about it as big as the handle of a small knife. The eatable part lies between the skin and the core; it is as white as snow, and somewhat of the consistence of new bread; it must be roasted before it is eaten, being first divided into three or four — its taste is insipid, with a slight sweetness resembling that of the crumb of wheaten — with a Jerusalem artichoke. This cooked in a kind of oven, which ren-

ders it soft, and something like a boiled potato, not quite so farinaceous as a good one, but not so than those of the middling sort. Of the bread-fruit they also make three dishes, by putting either water or the milk of the cocoa nut to it, and beating it to a paste with a stone pestle, and afterwards mixing it with ripe plantains, bananas, and the sour paste which they call *mabie*.

(3.) ARTOCARPUS, METHOD OF PREPARING THE UNRIPE. The MAHIE, which is bread made to serve as a succedaneum for ripe bread-fruit before the season is come on, is thus made. The fruit of the bread-tree is gathered just before it is perfectly ripe; and being laid in heaps, closely covered with leaves: in this state it undergoes a fermentation, and becomes disagreeably sweet; the core is then taken out entire, and is done by gently pulling out the stalk, and the rest of the fruit is thrown into a hole which is dug for that purpose generally in the houses, and is lined in the bottom and sides with grass. The whole is then covered with leaves and heavy stones laid upon them; in this state it undergoes a second fermentation, and becomes sour, after which it will suffer no change for many months. When taken out of the hole as it is wanted for use, being made into balls, it is wrapped up in leaves and baked: after it is dressed, it will keep for four or six weeks. It is eaten both cold and hot: but the natives seldom make a meal without it, though to Europeans the taste is as disagreeable as that of a pickled olive generally is the first time it is eaten. The fruit itself is in season 8 months in the year, and the mahie supplies the inhabitants during the other four.

(4.) ARTOCARPUS, SPECIES OF THE, &c. To procure this principal article of their food, these happy people no trouble or labour, except climbing up a tree: the tree which produces it does not indeed grow spontaneously; but if a man plants ten of them in his life-time, which he can do in an hour, he will as completely fulfil his duty to his own and future generations, as the five of our less temperate climate can do, by planting in the cold of winter, and reaping in the summer's heat, as often as these seasons return, even if, after he has procured bread for his present household, he should convert a surplus into money, and lay it up for his children. There are two species of this tree, viz.

1. ARTOCARPUS INCISUS, with gashed leaves.
2. ARTOCARPUS INTEGRIFOLIA, with entire leaves.

(5.) ARTOCARPUS, VARIETY OF THE. There is said to be another distinction, into that which bears fruit with stones or seeds, and that in which the fruit has none. The parts of fructification of the tree which bears the fruit without stones are defective. The amentum, or catkin, which contains the male parts, never expands. The styli, or female parts of the fruit, are likewise deficient: From which it follows, that there can be no stones or seeds, and therefore this tree can only be propagated by suckers or layers; although it is abundantly evident, that it must originally have proceeded from the seed-bearing bread-fruit tree. In some instances of this kind we sometimes find in European fruits; such as the barberry, and the Cornelian cherry.

pe from Zant, commonly called currants, which therefore be increased only by layers and cuttings. Dr Solander was assured by the oldest inhabitants of Otaheite and the adjoining islands, that they well remembered, there was formerly plenty of the seed bearing bread-fruit; but they had neglected upon account of the preference given to the bread-fruit without seed, which they propagate by suckers.

ARTOIS, a ci-devant province of France, extremely fertile, and formerly one of the 17 provinces of the Netherlands. The name was derived from the Atrebates, the ancient inhabitants. Its greatest length from N. to S. was about 24 leagues, its breadth about 12, being bounded to the S. W. by Picardy, to the E. by Hainault, and to the N. by Flanders. It is now included in the department of the Straits of Calais.

ARTOLICA, in ancient geography, a town of Salassii, in Gallia Cispadana, at the foot of the Alps; now called TUILE, a hamlet at the foot of Mount St Bernard the Less.

ARTOMELI, [from *artos*, bread, and *melis*, honey,] in ancient pharmacy, a kind of cataplasm, made of bread and honey, applied chiefly to *præcordia*.

ARTONNE, an ancient small town of France, in the department of Cantal, seated on the Morges.

ARTOTYRISTS, } [from *artos* and *tyros*,
ARTOTYRITÆ, or } cheese,] a branch of the
ARTOTYRITES, } ancient Montanists, who
appeared in the 2d century, in Galatia. They
ate bread and cheese in the Eucharist, or perhaps
it was baked with cheese. Their reason was, that
the first men offered to God not only the fruits of
the earth, but of their flocks too.

ARTRO, a river in Merionethshire.

ARTS. See ART, No. I. § 3—12.

ARTUATE. *v. a.* To tear limb from limb.

ARTUOSE. *adj.* well fet; strong made. *Bailey*.

ARTYSTONA, the daughter of Cyrus the Great, and wife of Darius I.

ARTUA, in ancient geography, a town of Bætica, the resort of the Conventus Hispalensis, now called *Sanlúcar*, a citadel of Andalusia, on the Bætis, or Guadalquivir, 7 leagues above Seville.

ARVAD, or ARADUS, an ancient city of Phœnicia, built on a small island, S. of Tyre, about 5 miles from the Continent. It was formerly famous for commerce and riches, and commonly predicted the fate of Tyre. It is now called RUADDE, and belongs to the Turks. It is quite ruinous, having only an old fort and a few cannons to defend it; but the height of the island gives it a good appearance from a distance.

ARVADITES, the ancient inhabitants of Arvad. They were the descendants of Canaan, and peopled it soon after the flood. In Ezekiel's time they were employed as mariners in the Tyrian galleys and guards on their walls. Ezek. xxvii. 8, 11.

ARVAL. See ARVIL.

ARVALES FRATRES, in Roman antiquity, a college of 12 priests, instituted by Romulus, and chosen out of the most noble families, himself being one of the body: they assisted in the sacrifices of the ambervalia annually offered to Ceres and Bacchus, for the prosperity of the fruits of the

earth; when they wore on their heads crowns made of ears of corn.—The original of this institution was as follows: Acca Laurentia, Romulus's nurse, was accustomed once a-year to make a solemn sacrifice for a blessing on the fields, her 12 sons always assisting her in the solemnity; but at last losing one of her sons, Romulus offered himself to supply his place, and gave this small society the name of *Arvales fratres*. This order was in great repute at Rome: they held the dignity for life, and never lost it upon account of imprisonment, banishment, or any other accident.

ARVANS, ST, a village of Monmouthshire, a little N. of Chepstow, seated on the river Chepstow.

ARUBA, a small island on the coast of Terra Firma, subject to the Dutch, and situated in Long. 69. 39. W. Lat. 12. 30. N.

ARUCH. See BARBAROSSA.

(1.) ARUCI NOVUM, in ancient geography, a town of the Celtici, N. of Lusitania, now supposed to be MOURA, a small city of Portugal, near the confluence of the Ardila and Guadalquivir.

(2.) ARUCI VETUS, a small city of the Turdetani, in Bætica, now called *Aroche*, a hamlet of Andalusia, on the confines of Portugal and Estremadura, on the river Gama, 7 leagues E. of Aruci Novum.

ARUCIA, in ancient geography, a town of Illyria, in the inland parts of Liburnia, now called BREGNA, according to some; but OTTOSCHATZ, according to others; a citadel of Morlachia.

ARUCITANUS, a mountain near Aruci Vetus, now called *Sierra de Aroche*.

ARUE, a river of France in the department of Mont Blanc.

(1.) ARVERNI, a brave and ancient people; and one of the most powerful nations of Gaul, claimed affinity with the Romans, as descendants from Antenor; and after their conquests by the Romans, their ancient liberty was preserved to them on account of their bravery.

(2.) ARVERNI, an appellation early used for the capital of the Arverni, according to the custom of the latter ages of naming towns from the people; it was formerly called *Nemossos*. Above 1000 years ago the town was called *Clarus Mons*, from its situation; it is now called CLERMONT. Long. 3. 20. E. Lat. 45. 42. N.

ARVERT, 1. an island of France, in the department of Lower Charente, situated S. of the mouth of the Soder, and E. of that of Marenne: 2. a town, in the island.

(1.) ARVIL, or ARVAL, a funeral.

(2.) ARVIL BREAD, loaves distributed to the poor at funerals.

(3.) ARVIL SUPPER, a feast or entertainment made at funerals, in the north part of England.

ARVIRAGUS, the son of Cunobelin, an ancient British king, who flourished in the time of Claudius and Domitian. He succeeded his brother, A. D. 44. and gained a complete victory over Claudius: but being soon after besieged in the city of Winchester, he made a treaty with the Romans, and married the emperor's daughter Genissa. This monarch confirmed the ancient laws, enacted new ones, and liberally rewarded persons of merit. He died A. D. 74.

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ion, the compound powder; but in that form virtues are very precarious. Some recommend a tincture of it drawn with wine; but neither water, nor spirits, extract its virtues.

III.) ARUM, AFRICAN. See CALLA.

IV.) ARUM, FLOATING. See ORONTIUM.

ARUN, a river in Suffex.

ARUNCUS, GREATER MEADOW-SWEET, in my, a genus of plants, called by Tournefort, others, *barra capra*; and by Linnæus *spira*. A plant has been supposed to be of the same as with the *filipendula*; but, by the examination of the flowers, they appear to be extremely rent.

ARUNDA, a town of Hispania Bætica, on the as, or Guadiana, now said to be RONDA, in Andalusia, on the confines of Andalusia. Long. 5. W. Lat. 36. 26. N.

ARUNDEL, a borough and market town in Suffex, seated on the N. W. side of the Arun, which there is a bridge. It had a harbour, in a ship of 100 ton burthen might ride; the sea had ruined it so far, that in 1733, an act passed for repairing it, and for erecting new locks, &c. The castle is seated on the east of the Tame, and is reputed to be a mile in circumference.

It sends two members to parliament; and is 10 miles S. W. by S. of London, and 10 miles from Chichester. Arundel is the premier earldom in England, belonging to the illustrious family of Arundel; and is the only title in England that goes along with the lands. Long. 8. 25. W. Lat. 5. N.

ARUNDEL OIL, in the materia medica. At Arundel, in the East India bay, Gambroon, and Suart, in the East India bay, there grows a tree which bears a nut inclosed in a rough husk; resembling the horse chestnut, and the kernel of the nut yields an oil by distillation, which is of a purgative nature. A spoonful of it is reckoned a dose. The tree is called the *Arundel tree* at Bombay; and its oil the *Arundel oil*. Mr Sinclair, one of the surgeons belonging to the royal regiment of artillery, who was formerly surgeon to an East India ship, gave Lord Arundel of London a small bottle full of this oil, which he said was much used for the cure of dysentery in India; and that he had given it in several recent cases of dysentery with success.—Dr Ross thinks it probable that this is the oil of the nuts mentioned in Dale's Pharmacologia, which are got from the tree called *Lignum Molue*, and the *palmia Christi Indica*, of Tournefort.

ARUNDEL, Thomas, archbishop of Canterbury, in the reigns of Richard II. Henry IV. and Henry V. He was the 2d son of Robert Earl of Arundel, and brother of Richard Earl of Arundel, who was beheaded. In 1375, at 22 years of age, being archdeacon of Taunton he was raised to the bishopric of Ely, in the reign of Edward III. He was a great benefactor to the church and patron of this see; among other donations he gave a table of massy gold, adorned with precious stones, which had been given to prince Edward by the king of Spain, and sold by the latter to the archbishop Arundel. In 1386, he was appointed chancellor of England; in 1388, he was translated to the archiepiscopal see of York; and, in 1402. II. PART II.

1396, to that of Canterbury, where he resigned the chancelorship. This was the first instance of the translation of an archbishop of York to the see of Canterbury. Scarcely was he fixed in this see, when he had a contest with the University of Oxford about the right of visitation. The affair was referred to king Richard, who determined it in favour of the archbishop. At his visitation in London, he revived an old constitution, by which the inhabitants of the respective parishes were obliged to pay to their rector one halfpenny in the pound out of the rent of their houses. In the 2d year of his translation, a parliament being held at London, the commons, with the king's leave, impeached the archbishop, together with his brother the Earl of Arundel, and the Duke of Gloucester, of high treason. The archbishop was sentenced to be banished, and within 40 days to depart the kingdom on pain of death. He retired first to France; and then to the court of Rome, where Pope Boniface IX. gave him a kind reception. About this time the Duke of Lancaster, afterwards Henry IV. was in France, having been banished by king Richard. The nobility and others, tired with the oppressions of Richard, solicited the Duke to take the crown. This their request they drew up in a letter, and sent it over by faithful messengers to archbishop Arundel, desiring him to be their advocate on this occasion with the Duke. The archbishop, being a fellow-sufferer, gladly accepted the office; and went with the messengers to the Duke at Paris, where they delivered the letters from the nobles and commons of England, and the archbishop seconded them with the best arguments he could invent. The inviting offer, after some objections which were easily obviated, the Duke accepted; and upon his accession to the throne, Arundel, who had returned with him to England, was restored to his see. In the first year of this prince's reign, Arundel summoned a synod which sat at St Paul's. The next year the commons moved that the revenues of the church might be applied to the service of the public; but Arundel opposed the motion with such vigour, that it was thrown aside. In 1408, Arundel began to exert himself against the Lollards, or Wickliffites; and his zeal for suppressing that sect carried him to several unjustifiable severities against the heads of it, particularly against Sir John Oldcastle and Lord Cobham. He also procured a synodical constitution, which forbade the translation of the Scriptures into the vulgar tongue. He died at Canterbury, in 1413, of an inflammation in his throat, with which he was seized whilst he was pronouncing sentence upon Lord Cobham. The Lollards asserted this to be a judgment from God; and indeed Bishop Goodwin speaks in the same manner, saying, "He who had withheld from the people the word of God, the food of the soul, by the just judgment of God had his throat so closed, that he could not speak a single word, nor swallow meat or drink, and was so starved to death." He was buried in the cathedral church of Canterbury, under a monument erected by himself. To this church he was a considerable benefactor: for he built the lantern tower and great part of the nave; gave a ring of

five bells, called from his *Arundel's ring*; seven rich ornaments, a mitre encased with jewels, a silver gilt crozier, and two golden chalices.

(4.) ARUNDEL TREE. See ARUNDEL OIL.

(5.) ARUNDELIAN MARBLES. OXFORD MARBLES, or PARIAN CHRONICLE, are ancient stones (as has been supposed), wherein is inscribed a chronicle of the city of Athens, engraved in capital letters in the island of Paros, one of the Cyclades, 364 years before Jesus Christ. They take their first name from Thomas Earl of Arundel, who procured them out of the East, or from Henry his grandson, who presented them to the University of Oxford. The Arundelian Marbles, in their perfect state, contained a chronological detail of the principal events of Greece during a period of 1318 years, beginning with Cecrops, before Christ 1585 years, and ending with the archbishop of Diogenes, before Christ 264. But the chronicle of the last 90 years is lost; so that the part now remaining ends at the archbishop of Diogenes, 354 years before the birth of Christ; and in this fragment the inscription is at present so much corroded and effaced, that the sense can only be discovered by very learned and industrious antiquaries, or, more properly speaking, supplied by their conjectures. This chronicle, and many other relics of antiquity, real or pretended, were purchased in Asia Minor, in Greece, or in the islands of the Archipelago, by Mr William Petty, who in the year 1614 was sent by Thomas Earl of Arundel for the purpose of making such collections for him in the East. They were brought into England about the beginning of the year 1617, and placed in the gardens belonging to Arundel house in London. Soon after their arrival they excited a general curiosity, and were viewed by many inquisitive and learned men; among others by Sir Robert Cotton, who prevailed upon Selden to employ his abilities in explaining the Greek inscriptions. Selden and two of his friends, Patrick Young, or, as he styled himself in Latin, *Patrius Junius*, and Richard James, immediately commenced their operations, by cleaning and examining the marble containing the Smyrnan and Magnesian legends, and afterwards proceeded to the Parian chronicle.—The following year Selden published a small volume in quarto, including about 39 inscriptions copied from the marbles. In the turbulent reign of Charles I. and the subsequent usurpation, Arundel-house was often deserted by the illustrious owners; and, in their absence, some of the marbles were defaced and broken, and others either stolen or used for the ordinary purposes of architecture. The chronological marble, in particular, was unfortunately broken and defaced. The upper part, containing 31 epochs, had to have been worked up in repairing archway in Arundel-house. In 1662, the Hon. Henry Howard, afterwards Duke of Norfolk, the grandson of the first collector, presented these supposed remains of antiquity to the university of Oxford. Selden's work becoming very scarce, Bishop Fell engaged Mr Prideaux to publish a new edition of the inscriptions, which was printed at Oxford in 1676. In 1733 a treatise published the public with a more economical view of the marbles than either of his

predecessors. Lastly, Dr Chandler published a new and improved copy of the marbles, in which he corrected the mistakes of the former editors; and in some of the inscriptions, particularly that of the Parian chronicle, supplied the lacunae by many ingenious conjectures.

(6.) ARUNDELIAN MARBLES, AUTHENTICITY OF THE, DOUBTED. The Arundelian marbles have generally been regarded as a canon of antiquity. They were, however, discovered in some instances to be inconsistent with the most authentic historical accounts; and the authenticity of several of them has been generally questioned. In this dissertation such inquiry as well as judgment and a great deal of ancient learning are displayed. His doubts, the author observes, arise from the following considerations.

(1.) ARUNDELIAN MARBLES, OBJECTION TO THE AUTHENTICITY OF THE. 1. The characters have no certain or unequivocal mark of antiquity. The π and χ , which frequently occur in the form supposed to be the most ancient, viz. the perpendicular line of the π on the hand, only half as long as that on the other; the χ in the form of a prostrate π , as is known, that any modern fabricator of a false inscription, which he intends to impose upon the world as a relic of antiquity, would most probably use them in preference to the more common and ordinary forms. But the letters in the chronicle have no appearance of antiquity, this very equivocal one. They do not in the least resemble the Sycean, the Nemean, or the other ancient dates. They differ, in many respects, from the letters on the Marmor Parium, which, according to the learned usage of the inscription, was engraved in the year before Christ 374. They bear no sort of resemblance to characters on the Farnesian pillars, to those of an Alexandrian manuscript, or others of a later date. They seem, continues our author, to resemble perhaps more than any other, the letters of the alphabet, taken by Montauson, from the most Lycopolitan at Verice. They are plain and simple in their form, and such as a modern stone cutter of the present age would produce, if he were employed to engrave a false inscription, according to the alphabet now in use. The small letters, intermixed among the capitals, have, in the opinion of our author, no appearance of antiquity, rather than genuine antiquity; and he is persuaded, that the acceptance of an inscription can never be proved by the form of the letters, because the most ancient nations may be as easily counterfeited as the modern. He observes, that the characters which compose our present alphabet, as a learned reader may form a comparison of the characters in the Parian chronicle, the same compared them with those of other nations, and given what is usually termed a false alphabet, regard to several archaisms, as they are called in this chronicle, and which our author contends, that no conclusion can be drawn

from them in favour of its antiquity. What reason could there be, he asks, for introducing these into the Parian chronicle? We do not usually find them in Greek writers of the same age, or even in those of the most early date. The reign of Ptolemy Philadelphus, with the 21st year of which the date of the chronicle coincides, was not an age of rude antiquity, with respect to the Greek language; being only 130 years after the time of Xenophon and Plato, when the Greek was spoken and written in its utmost purity and elegance: and we can scarcely suppose, that even a stone cutter, in that refined age, would have been permitted to disgrace a superb and learned monument, with such barbarisms as occur in the chronicle. The archaisms, however, he remarks, are not uniformly observed in this inscription. He adduces six instances of deviation; and adds, he almost tempted to suspect, that *ἐν Πάροις, ἐν Μελίται*, and other pretended archaisms, are owing to a mere affectation of antiquity, or to a corrupted dialect and pronunciation in later ages.—These archaisms, our author acknowledges, appear on other marbles: but he thinks, that, for a very reason, they would naturally be adopted by the fabricator of a supposititious inscription; and the authenticity of those inscriptions in which they appear, must be established, before they can be urged in opposition to the present argument. “It is not probable that the chronicle was engraved for *private use*.” Our author thinks it an unlikely supposition that such an expensive and laborious work could have been executed by a private citizen, either for his own amusement, or for the benefit of his fellow citizens. In the first place, a long inscription could not be engraved in marble, without such an expence as few learned men were able to afford. Or, if its author, in uncommon felicity, was able to erect such a literary monument, the scheme would have been useless and imprudent; as all the contents of the inscription might have been published more commodiously and effectually by the common mode of writing in use at that time. A variety of arguments is adduced, illustrating the improbability of a manuscript, to such an inscription as the chronicle, in a number of respects; and showing the improbability of its having ever been executed, either for public or private use. The evidence from ancient history is likewise adduced in support of the assertion, that the common mode of writing, in the reign of Ptolemy Philadelphus, was not on stones. It is not, however, necessary to prove, by the testimony of ancient authors, that books were written on parchment, or paper made of the Egyptian papyrus, or any such materials, before the date of the Parian chronicle. This is sufficiently evinced by the very writings of Moses, David, Solomon, the Jewish prophets; the works of Homer, Hesiod, Anacreon, Pindar, Æschylus, Sophocles, Euripides, Herodotus, Hippocrates, Aristophanes, Thucydides, Xenophon, Plato, Demosthenes, Aristotle, &c. and it is incontestably proved by the libraries which were collected in preceding ages, or about that time; such as those of Polyarchus in Samos, Pisistratus and Euclides at Athens, Nicocrates in Cyprus, Euripides the poet, and the philosopher, Clearchus at Heraclea

Pontica, and the most extensive and magnificent library of Ptolemy Philadelphus in Egypt, founded in or before the year 284, which in his time is said to have contained 100,000 volumes, and to have been enlarged by his successors to the amount of almost 700,000. Not long afterwards a library was founded at Pergamus by Attalus and Eumenes, which, according to Plutarch, contained 200,000. These are clear and decisive proofs, that the common mode of writing in the time of Ptolemy Philadelphus was not on stones. III. “The chronicle does not appear to have been engraved by *public authority*.” 1. The first argument in support of this opinion is, that inscriptions of that kind usually begin with a particular form: as, *Ἡ βουτὴ καὶ ὁ δῆμος*, “The senate and the people;” or thus, *ἐδόξε τῇ βουτῇ καὶ τοῖς δῆμοις*, “It pleased the senate and the people, &c.” But the Parian chronicle begins in the manner of a private man, speaking of his own performance in the first person singular. This argument, our author remarks, cannot be much affected by observing, that the beginning of the inscription is obliterated; for it is necessarily implied by the words now remaining. 2. The facts and dates, which are mentioned in this chronicle, do not appear to have been extracted from any public records, or calculated to answer the purpose of authentic documents; as many eminent princes and magistrates are passed over without notice; in several instances, the transactions of whole centuries are omitted; and the facts, chiefly specified, are not matters of general or national importance. 3. The Parian inscription is such a one as we can hardly suppose the magistrates or the people of Paros would have ordered to be engraved. Stately sepulchres, pillars, triumphal arches, and the like, were erected to perpetuate the glory of eminent men. The remembrance of events in which nations were interested, the succession of princes, &c. were preserved in the same manner. Leagues, decrees, and laws, were likewise engraved on marble or brass, and fixed to a pillar, the walls of a temple, or other public buildings; because such inscriptions were designed for the inspection of the people, as they essentially concerned their conduct, their property, their liberty, or their lives. But, our author asks, for whom could the chronicle of Paros be intended? It contains no encomiums on any of the patriots, the heroes, or the demigods of the country, no decrees of the magistrates, no public records, no laws of state.—On the contrary, it is a work of mere speculation and learning, in which the inhabitants of that island, especially the common people, had not the least interest or concern. These words at the beginning, *ἀρχὴν τῆς ἐν Πάροις*, would naturally lead us to suppose, that the inscription related to Paros. And, if so, it would have been natural for the author to have mentioned some of the most important occurrences in the history of that island. But, says this acute and learned critic, what scheme does our chronologer pursue on this occasion? Does he record the events and revolutions of his own country? Does he mention any of the battles, sieges, and treaties of the Parians? any of their public institutions? any of their po-

series, *Chronographia*, and *Chronica* and the special series of metricals is subjoined:—
“Thucydides, I know, lived 240 years before the chronicle is said to have been written; but if Thucydides, as well as his successors, complained that the Greeks had not accurately preserved the series of Greek history, from whence can we suppose the author of this inscription collected such a clear, determinate, and comprehensive system of chronology? If he had any sources of information, which were unknown to succeeding writers, how happens it, that they should all of them overlook the most confidential, most exact, most authentic, and most valuable source of ancient account of their early ages? Why did they not copy his most memorable epochs? Why did they not produce his authority? Or, at least, why did they not mention his opinion? Surely nothing, to all appearance, could be more elaborate, more important, or of higher authority, than a chronological table, which was thought worthy of a chronological table of the world.”—
“The chronicle is not once mentioned by any writer of antiquity.” This indeed appears a strong argument against its authenticity. Apollodorus, an Athenian, the disciple of Anaxarchus the grammarian, and Panæthus the philosopher, wrote a genealogical historical work on the early ages of the Greeks, but though composed 120 years after the date of the *Pantheon*, does not contain the smallest traces of a systematical chronology. It is remarkable too that the chronicle of Apollonius is quoted by Diogenes Scerinus, Strabo, Plutarch, A. Gellius, Lucian, and many other writers of antiquity; while the *Pantheon* chronicle, which comprehends more extensive period, is never mentioned. It is true, however, such a wonderful coincidence is not to be expected. It has existed 564 years before the Christian era, and must have excited a general attention, and been regarded as an authority by writers of success.

BY WHICH OUR AUTHOR endeavours to prove the Parian chronicle has, in this instance, the sanction of Julian's various history, seems decisive of the matter. He observes, that his names may be met with in no different manner than in the 1779,000,600 different transcriptions; but then, that there is no particular reason to manage rather than another, it will follow the chance of two authors placing the same order, in, the former case, as in the other, and in the latter, as 1 to 1779,000,600. Therefore, says he, it is very probable, that both authors, in this instance, have been misled by the author of the inscription had not seen them from the historian. It may indeed be with regard to this singularity of arrangement the Parian chronicle and Julian's various history, that the inference might be very easily drawn, which is specified by our author. But this should have been the Parian chronicle, which is the only one that has been actually copied a line of towns, arranged according to chronological or topographical order. It is indeed a supposition equally improper as the other. VII. "Parachronisms appear in the epochs, which we can scarcely but conclude the Parian chronologist in the 22th Olympiad to be liable to commit." After specifying the inaccuracies, he asks, Would a writer of such a work have been so negligent as to have neglected the names of ancient Greece, count the years, in opposition to the most polished nations of the most accurate historians, of such public notoriety? Would a private citizen, or magistrate of Paros, order a cult and a festival of epochs to be engraved, of such consequence, and transmitted to posterity, with so much care and industry? Would the history of the island of Paros, the Parian chronicle, be so much neglected as to be so obscure and unknown to us? On this point

[illegible]

that it is attended with some suspicious circumstances, and without any of those clear and unequivocal evidences, which always discriminate truth from falsehood. There are no data in the inscription by which to discover the place where the marble was erected. The place likewise where it was found is not ascertained; though the generality of writers who have had only occasion to mention it have supposed that it was found in the island of Paros. If it was erected at Smyrna, as some imagine, our author asks, for what purpose does the writer mention, *Astyanax* the archon of Paros, and not one circumstance relative to Smyrna? If, he adds, it was erected at Paros, why does he not mention more archons than one? Or how shall we account for his profound silence with respect to all the events and revolutions which must have happened in that island, and have been infinitely more interesting to the natives than the transactions of any sovereign country? The train of circumstances by which the Parian chronicle came into the possession of Mr Petty, whom Lord Arundel had sent into the East for the purpose of collecting antiquities, as well as the subsequent conduct of Peiresc its former owner, affords our author a strong presumption, that "the inscription was actually fabricated, with a view of obtaining for it a high price, upon the pretence that it was a relic of great antiquity. It is certain, that there is something mysterious in the conduct of the first ostensible proprietors. These marbles had been totally unknown, or unnoticed, for almost 900 years, and at last they are dug out of the ground—no body can tell us when or where!"

X. "The literary world has been frequently imposed upon by spurious books and inscriptions; and therefore we should be extremely cautious with regard to what we receive under the venerable name of antiquity." This proposition is illustrated by a great variety of examples, and very properly exposes the forgeries which have disgraced the republic of letters in different ages; and although one of the more recent ones cited, namely, *Ossian's* poems, be a point very far indeed from being established, yet that deceptions of this kind have been practised is an unquestionable fact. In endeavouring, towards the end of his dissertation, to investigate the time of the supposed forgery, he observes, That the 16th century, and the prior part of the 17th century, produced a multitude of grammarians, critics, and commentators, deeply versed in Grecian literature, and amply qualified for the compilation of such a chronological system as that of the Arundelian marbles. Above all, the sciences of chronology was particularly studied and investigated about that time: "Nunc fervet chronologia," says Scaliger in the year 1605, "omnes hoc ferrum excafaciunt." Chasaubon treats those persons with contempt who were unacquainted with the improvements which had been made in that department of learning after the revival of letters. Innumerable systems of chronology had been published before the year 1625; from which it was easy to extract a series of memorable events, and give the compilation a Grecian dress. "The avidity," says our author, "with which all relics of antiquity were then collected, and the high price at which they were

purchased, were sufficient inducements to any one, whose avarice or whose necessity was stronger than his integrity, to engrave his labours on marble, and transmit them to Smyrna, as a commodious emporium for such rarities." The precise period of the fabrication, however, must still be reckoned apocryphal and uncertain. The sum of 50 guineas, which Peiresc gave to the supposed fabricator, was inadequate to such a laborious and extensive work. Upon the whole, perhaps, it would be too hasty to pronounce decisively that this famous chronicle, so long respected, is an imposition upon the public. It may, however, be safely affirmed, that the suspicions against it are extremely strong, and the objections already cited of a nature very difficult to be removed. No attempts have yet been made with this view.

ARUNDIFEROUS, *adj.* bearing reeds. *Bailey.*

* ARUNDINACEOUS. *adj.* [*arundinaceus*, Lat.] Of or like reeds. *DiC.*

* ARUNDINEOUS. *adj.* [*arundineus*, Lat.] Abounding with reeds.

ARUNDINOSE. See the last article.

(I. 1.) ARUNDO, in botany, the REED: A genus of the digynia order, belonging to the triandria class of plants; and in the natural method ranking under the 4th order, Gramina. The calyx consists of two valves, and the floscules are thick and downy. There are 6 species, viz.

1. ARUNDO ARBOREA, has a tree-like stalk, with narrow leaves, and in all other respects resembles the BAMBOOS. See N° 2.

2. ARUNDO BAMBOS, or the bamboo, is a native of the East Indies and some parts of America; where it frequently attains the height of 60 feet. See BAMBOO. The main root is long, thick, jointed, spreads horizontally, and sends out many cylindrical woody fibres, of a whitish colour, and many feet long. From the joints of the main root spring several round jointed stalks to a prodigious height, and at about 10 or 12 feet from the ground send out at their joints several stalks joined together at their base: these run up in the same manner as those they shoot out from. If any of these be planted with a piece of the first stalk adhering to them, they will perpetuate their species. They are armed at their joints with one or two sharp rigid spines, and furnished with oblong oval leaves, eight or nine inches long, seated on short footstalks. The flowers are produced in large panicles from the joints of the stalks, placed three in a parcel close to their receptacles: they resemble those of the common reed, and are succeeded by seeds of the same form surrounded with down. The young shoots are covered with a dark green bark; these when very tender are put in vinegar, salt, garlic, and the pods of capsicum, and thus afford a pickle, which is esteemed a valuable condiment in the Indies, and is said greatly to promote the appetite and assist digestion. See ACHIAR. The stalks in their young state are almost solid, and contain a milky juice: this is of a sweet nature; and as the stalks advance in age, they become hollow except at the joints, where they are stopped by a woody membrane, upon which this liquor lodges, and concretes into a substance called TABAXIR, or sugar of *Mombu*, which was held in such esteem by the ancients, in some particular disorders,

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ARWANACK, a village in Cornwall near Penzance and Plymouth.

ARWERTON, a small town in Suffolk N. W. Harwich, near the junction of the Orwell and Stour.

ARWOTHAL, a village in Cornwall, 4 miles W. of Truro.

1.) **ARX**, in the ancient military art, a town, fort, or castle, for defence of a place. The arx, in ancient Rome, was a distinct edifice from the Capitol, though some have confounded the two. According to Ryckius, the arx, properly speaking, was a place on the highest part of the Capitoline Mount, stronger and better fortified than the rest, with towers and pinnated walls; in which was also the temple of Jupiter Capitolinus.

2.) **ARX** was also a consecrated place on the Capitoline Mount, where the augurs publicly performed their office. Some will have the arx to have been the augural temple; but Varro expressly distinguishes between the two. Of this arx the *ales*, or heralds, gathered the grass used in the ceremony of making leagues and treaties.

3.) **ARX BRITANNICA**, a citadel of Batavia, the foundation is seen at low water, near the mouth of the middle Rhine: some imagine it a pharos or high tower of Caligula, as Suetonius says; a monument of Caligula's sham conquest in Britain. Others, that it was built by Drusus, and an altar afterwards by Claudius, on his expedition into Britain. But the usual passage was at Gesoriacum; and Suetonius expressly says, Claudius passed over thence. The ancient name of this citadel, now covered by the sea, is now expressed: Now commonly called 't *Huis ten Bosch*, or *Brittenburg*; that is, *Arx Britannica*; from what authority does not appear.

ARYTÆNOIDES, in anatomy, two cartilages, which, with others, constitute the head of the trachea. It is also applied to some muscles of the trachea.

ARYTÆNOIDEUS, in anatomy, one of the muscles serving to close the larynx.

ARYTHMUS, in medicine, the want of a just relation in the pulse. It is opposed to *eurythmus*, a pulse modulated agreeably to nature.

ARZEO, or **AARSEO**, a town of Algiers near the mouth of the Mina, which trades with Gambia, Numidia and other places. Long. 2. 10. E. Lat. 36. 50. N.

ARZEW, a sea port of Algiers.

ARZILLA, a very ancient maritime town of Morocco, in the kingdom of Fez, about 15 miles S. W. of Tangiers. Walker makes it 50. It is situated at the mouth of a river, and inhabited by Moors and Jews, who carry on no trade. It was formerly a Roman colony; afterward fell under the government of the Goths, and was next taken by the Mahometans. Alphonso of Portugal, surmounting the African, took it by assault in 1472, and carried away the presumptive heir of the crown. When that prince came to the throne, he besieged it in 1508, with 100,000 men; but was obliged to abandon the undertaking. However, at length the Portuguese forsook it of their own accord.

Long. 5. 40. W. Lat. 35. 40. N.

ARZINA, a river of Lapland.

1.) **AS**, among the ancient Romans, a particular weight, consisting of 12 ounces; being the same with *libra*, or the Roman pound. The word is derived from the Greek *as*, which in the Doric dialect is used for *as*, *one*, q. d. an entire thing; though others will have it named *as* quasi *as*, because made of brass.

(2.) **As** was also the name of a Roman coin, which was of different weights and different matter in different ages of the commonwealth.—Under Numa Pompilius, according to Eusebius, the Roman money was either of wood, leather, or shells. In the time of Tullus Hostilius, it was of brass; and called *as*, *libra*, *libella*, or *pondo*, because actually weighing a pound or 12 ounces. About 420 years after, the first Punic war having exhausted the treasury, they reduced the *as* to two ounces. In the second Punic war, Hannibal pressing very hard upon them, they reduced the *as* to half its weight, viz. to one ounce. And lastly, by the Papirian law, they took away half an ounce more, and consequently reduced the *as* to the diminutive weight of half an ounce: and it is generally thought that it continued the same during the commonwealth, and even till the reign of Vespasian. The *as* therefore was of four different weights in the commonwealth. Its original stamp was that of a sheep, ox, or sow: but from the time of the emperors, it had on one side a Janus with two faces, and on the reverse the rostrum or prow of a ship.

(3.) **As** was also used to denote any integer or whole. Whence the English word *ace*.—Thus *as* signified the whole inheritance; whence *heres ex affe*, the heir to the whole estate.

(II.) * **As. conjunct.** [*als*, Teut.] 1. In the same manner with something else.—

When thou dost hear I am *as* I have been,
Approach me, and thou shalt be *as* thou wast.

Shakespeare.

In singing, *as* in piping, you excel;
And scarce your master could perform so well.

Dryden.

—I live *as* I did, I think *as* I did, I love you *as* I did; but all these are to no purpose: the world will not live, think, or love *as* I do. Swift. 2. In the manner that.—

Mad *as* I was, I could not bear his fate
With silent grief, but loudly blam'd the state.

Dryden's *Æn.*

—The landlord, in his shirt *as* he was, taking a candle in one hand, and a drawn sword in the other, ventured out of the room. *Arbutnot and Pope.* 3. That; in a consequential sense.—The cunningest mariners were so conquered by the storm, *as* they thought it best with stricken sails to yield to be governed by it. *Sidney.*—He had such a dexterous proclivity, *as* his teachers were fain to restrain his forwardness. *Wotton.*—The relations are so uncertain, *as* they require a great deal of examination. *Bacon.*—God shall by grace prevent sin so soon, *as* to keep the soul in the virginity of its first innocence. *South.* 4. In the state of another.—

Madam, were I *as* you, I'd take her counsel;
I'd speak my own distress.

A. Philips. *Distress Mother.*

5. Under a particular consideration; with a particular respect.—Besides that law which concerneth



belongs unto
thers in some
bes all several
of them hath
er's *Reckless*
as thy word

2 thou art but
prince, I fear
bon's whelp,
tions that are
follow. *Gay's*
; of the same
uniform idea,
same degree

matter blind,
in find.

Blackmore.
-eyed maid re-

t as wife.

Pope's Odyssey.
at would be ill-

sprong,
(*file-wail*),

it would fall.

Fairy Queen.
and to do that, as of themselves, which they con-

ceived he desired they should do. *Raymond.*

Contented as a nest of swan

He lies, as he he bids did know,

And to the wood no more would go. *Waller.*

So hot th' assault, so high the tumult rose,

As all the Danish and Argolick race

Had been contracted in that narrow space. *Dryden.*

Can misery so place of safety know,

The nose pursues me wheresoe'er I go,

As fate fought only me. *Dryden's Aurengzebe.*

9. According to what.—Who then is Paul, and

who is Apollon, but ministers by whom ye be-

lieved, even as the Lord gave to every man. 1 *Cor.*

Their figure being printed,

As just before, I think, I hinted,

Alma inform'd can try the case. *Prior.*

—The republic is shut up in the great duke's do-

minions, who at present is very much incensed a-

gainst it. The occasion is as follows. *Addison on*

Isab. 10. As it were; in some sort.—As for the

daughters of long Edward IV. they thought king

Richard had said enough for them; and took them

to be but as of the king's party, because they

were so his power, and at his disposal. *Bacon's*

Henry VII. 11. While; at the same time that.—

At either end, it whistled as it flew,

And as the brands were green, so dropp'd the

dew;

Infected as it fell with sweet of sanguine hue.

Dryden.

These haughty words Alecto's rage provoke,

And frighted Turnus trembled as she spoke.

Dryden.

So the pure limpid stream, when foul with rains

Of rushing torrents, and descending rains,

Works itself clear, and as it runs refines.

Addison's Cato.

14. Because.—He that commanded the injury to

be, is first bound; then he that did it; and

they also are obliged who did so ill, as with-

them the thing could not have been done. *Taylor.*

23. Because it is; because they are.—The king

draw out of the earth juice fit to nourish the

as those that would be trees themselves. *And.*

24. Equally.—

Before the place

A hundred doors a hundred entries gave:

As many voices issue, and the sound

Of Sybil's word as many times repeat. *D.*

25. How, in what manner.—Men are gene-

permitted to publish books, and contradictions

and even themselves, as they please, with a

danger of being confuted, as of being unde-

Boyle. 16. With; answering to his or four

Sister, well met; whither away lo!—

—Upon the like devotion as yourthe,

To gratulate the gentle princes there.

Shakespeare's Richard

27. In a reciprocal sense, answering to an-
offence committed in the state of nature, as

the state of nature, be also punished, and as

forth as it may in a commonwealth. *Locke.*

sure as it is good, that human nature holds

it; so certain it is, that the circular motion

of the earth and planets, rather than clari-

tions which might as possibly have been, be-

clare God. *Bosley.* 18. Going before as

comparative sense; the first as being im-

understood.—

Sempronius is as brave a man as Cato.

Bright as the sun, and like the morning

29. Answering to each.—Is it not every

interest, that there should be such a govern-

the world as designs our happiness, as we

vera as for our advantage? *Tillotson.* 30. As

so to answer it, in a conditional sense.—As

they carry light and conviction to any other

understanding, so far, I hope, my labour

of life to him. *Locke.* 31. It is sometimes

good.—As in my speculations I have en-
ded to extinguish passion and prejudice, I

delicious of doing some good in this part

Spectator. 32. Answering to a conditional

So may th' auspicious queen of love.

To thee, O sacred strip, be kind.

As thou to whom the muse commands.

The best of poets and of friends,

Dost thy committed pledge repeat.

33. Before how it is sometimes redundant

this in low language.

As how, dear Syphax?

34. It seems to be redundant before *at*

time.—Though that was captivated me

and this hath as yet lasted but 13, yet there

been much more action in the present war

35. Is a sense of compassion, follow-

36. As when a dab-chick wades through

On feet and wings, and flies, and rakes

37. So the rising sun, with shoulders, looks on

While as a windmill all his figure shows.

38. As you; with respect to.—As for

of those who have written against me, the

serve not the least notice. *Dryden's Fables Preface.*

27. AS IF; in the same manner that it would be if.—Answering their questions, *as if* it were a matter that needed it. *Locke.*

28. AS THOUGH; as if.—These should be at first gently treated, *as though* we expected an imposthumation. *Sharp's Surgery.*

29. AS TO; with respect to.—

I pray thee, speak to me *as to* thy thinkings, As thou dost ruminate; and give thy worst of thoughts

The worst of words. *Shakesp. Othello.*

—They pretend, in general, to great refinements, *as to* what regards Christianity. *Addison on Italy.*

—I was mistaken *as to* the day, placing that accident about thirty-six hours sooner than it happened. *Swift.*

a. AS WELL AS; equally with.—Each man's mind has some peculiarity, *as well as* his face, that distinguishes him from all others. *Locke.*—It is adorned with admirable pieces of sculpture, *as well as* modern *as* ancient. *Addison on Italy.*

(1.) ASA, [אסא, Heb. i. e. a healer of sickness] king of Judah, succeeded his father Abijam, A. M. 988. He abolished idolatry, restored the worship of the true God, and, with the assistance of an exiled king of Syria, took several towns from the king of Israel. He died A. A. C. 917, and was succeeded by Jehoshaphat.

(II. 1.) ASA among naturalists, a word taken by modern authors from the *lasar* of the ancients, and applied to a gum very different from that ancient—known by the name they have thus corrupted. The *asa* of the ancients was an odorous and fragrant gum; and the *asa* of the after ages had so little title to this epithet, that they distinguished it by an additional one, expressing its being of an offensive smell. See § 4. The Arabian writers, according to this distinction, describe two kinds of *asa*, the sinking, the other aromatic; and the modern Arabs preserved the name *asa*, or *lasar*, to the sinking gum the Latins called by that name, but added a distinctive epithet to express its smell, and called it *scardolasarum*.

(2.) ASA or ASSA, in the materia medica, a name given to two very different substances, called *asa dulcis* and *asa fetida*.

(3.) * ASA DULCIS. See BENZOIN.

(4.) * ASA FOETIDA. ASSA FOETIDA. *n. f.* A resin brought from the East Indies, of a rancid taste, and a strong offensive smell; which is distilled during the heat of summer, from a large shrub. *Chambers.*

(5.) ASA FOETIDA. See FERULA.

ASAD-ABAD, or ASER-ABAD, a town of Persia, 18 miles N. E. of Amadan. Long. 48. 25. E. Lat. 36. 20. N.

ASAHIEL, [אסאיהל, Heb. i. e. God has wrought,] one of the sons of Zeruah, David's sister, and the younger brother of Joab. He was one of David's heroes, and was remarkable for his swiftness. In the battle of Gibeon, he pursued Abner with much obstinacy, that he was obliged to kill him in self defence, though it would appear with reluctance. II Sam. ii. 19—23.

ASALT, a village in Cornwall, near Crimble.

(1.) ASAPH, [אסא, Heb. i. e. gathering,] the

son of Berachiah, a Gershomite, and a famous musician and psalmist under David king of Israel.—Twelve of the Psalms bear his name, but it is doubted whether he was the author of them all, as some of them relate to later times.

(2.) ASAPH, ST, a city of Flintshire, in N. Wales, situated in a pleasant valley, at the confluence of the Elwy and Cloyd; 24 miles W. of Chester and 209 N. W. of London. Long. 3. 36. W. Lat. 53. 12. N. As a bishopric, it is of great antiquity, and was founded about A. D. 560, by Kentigern, a Scot, bishop of Glasgow.—He began the church on the banks of the river Elwy, whence it is called by the Welch *Land Elwy*, and in Latin *Elwensis*. Kentigern returning into Scotland, left a holy man his successor, St Asaph. Who was his successor is uncertain, as there are no records that mention it; and it seems rather probable that the religious settled here had been necessitated to remove to some more peaceful abode, as the country was frequently the seat of war between the English and the Welch. This see was formerly very lucrative, but its revenues were greatly lessened by the profusion of bishop Parfew, who alienated much of the lands belonging to it. This diocese does not contain any one whole county; but consists of part of Denbigh, Flint (where its church is), Montgomery, and Merioneth shires, and a small part of Shropshire; wherein are 121 parishes, and 131 churches and chapels, most of which are in the immediate patronage of the bishop. This see has but one archdeaconry, viz. that of St Asaph, which is united to the bishopric, for the better maintenance thereof. It is valued in the king's books at L. 187 : 11, 6. but computed to be worth, annually, L. 1500. The tenth of the clergy comes to L. 186 : 19 : 6½. To this cathedral belong a bishop, a dean, archdeacon, chancellor, &c.

(3.) ASAPH, ST, was a native of N. Wales, descended of an ancient family and flourished under Carentius, king of the Britons, about A. D. 590. Being a monk in the convent of Llan Elvy, under Kentigern, he behaved with such sanctity that Llan-Elvy got his name ever after. See No. 2. He wrote the ordinances of his church, and the life of St Kentigern. Bayle says, he was the first who receivedunction from the pope.

ASAPHEIS, [ασαπεις, from α, negative, and σπης, clear,] persons who do not utter their words in a clear manner. The defect is occasioned, Galen says, "either by some hurt which the organs of speech have contracted from a disorder of the nerves, or else by a delirium."

ASAPHY, [ασαφης, Gr.] hoarseness, or lowness of voice.

ASAPPES, or AZAPPES, an order of soldiers in the Turkish army, whom they always expose to the first shock of the enemy; to the end that the enemy being thus fatigued, and their swords blunted, the spahis and janisaries may fall on and find an easy conquest. The word is derived from the Turkish *saph*, which signifies *rank*, from whence they have formed *asphaph*, to range in battle.—The asappes are said to be held of so little value, that they frequently serve as bridges for the cavalry to pass over in bad roads, and as fascines to fill up the ditches of places besieged! They travel

[illegible]

and the *ascendant* of life.—Such a planet styled in his *ascendant*. Jupiter was in his *ascendant*, &c.—Hence the word is also used in a moral sense, for a certain superiority which one man has over another, from some unknown cause.

(4.) **ASCENDANTS**, in law, are opposed to descendants in succession; i. e. when a father succeeds his son, or an uncle his nephew, &c. heritage is said to ascend, or go to ascendants.

° **ASCENDENCY**, *n. f.* [from *ascend*.] Influence; power.—Custom has some *ascendency* over understanding; and what at one time seemed decent, appears disagreeable afterwards. *Watts*.

ASCENDING, in astronomy, is said of such stars as are rising above the horizon in any parallel of the equator. And thus likewise,

1. **ASCENDING LATITUDE**, is the latitude of a planet when going towards the north pole.

2. **ASCENDING NODE**, is that point of a planet's orbit, wherein it passes the ecliptic, to proceed northward. This is otherwise called the *northern node*, and represented by this character ♈.

ASCENDING SIGNS, among astrologers, are those which are upon their ascent, or rise, from the nadir, or lower part of the heavens, to the zenith, or highest.

ASCENDING VESSELS, in anatomy, those which carry the blood upwards; as the *aorta ascendens*. See *ANATOMY*, IND.

(†) ° **ASCENSION** *n. f.* [*ascensio*, Lat.] 1. The act of ascending or rising, frequently applied to the visible elevation of our Saviour to heaven.—*Then rising from his grave,*

Spail'd principality, and pow' to triumph'd
In open show, and, with *aspersion* bright,
Captivity led captive through the air. *Pars. Lof.*

2. The thing rising, or mounting.—Men err in the theory of incubation, concerning the brain both on, suffer from vaporous *effluvia* from the stomach. *Brown's Falgar Errors*.

which, as far as we could discern from the summit, seemed to be totally changed by the fire of a volcano. Nearly in the centre of the plain a broad white mountain of great height, on which we discerned some verdure by the help of glasses, from whence it has obtained the name the *Green Mountain*. We landed early in the morning among some rocks, the surf being immensely high on the great beach, which consisted of minute shell sand, chiefly of a fine very deep, dry, and intolerable to the eyes the sun shined. We ascended among high black cavernous rocks, which perfectly resembled the most common lavas of *Vetulus* and *Isle*, and of which the broken pieces looked as if they had been accumulated by air. The lavas cooling very suddenly, may easily be supposed to produce such an effect. Having ascended 12 or 15 yards perpendicular, we found ourselves on a great level plain of 6 or 8 miles in extent, the different corners of which we observed the hill of an exact conical shape, and of a uniform colour standing perfectly insulated. Part of the plain between these conic hills was covered with great numbers of smaller hillocks, consisting of the same wild and ragged lava as that seen elsewhere, and ringing like galls when two pieces were joined together. The ground between the hills was covered with a black earth, on which we walked very firmly; but when the lava was so loose, and in such dry minute pieces, that the wind raised clouds of dust upon it. The conic hills consisted of a very different sort of lava which was red, soft, and crumbling to powder. One of these hills stands directly in front of the bay, and has a wooden cross on its summit, whence the bay is said to take its name. The hills are very steep, but a path near three quarters of a mile long, winds round it to the summit.

examining this remarkable country a little longer, concluded, with a great degree of probability on our side, That the plain on which we stood was once the crater or seat of a volcano, by the accumulation of whose cinders and pumice-stones conic hills had been gradually formed: that currents of lava which we now saw divided into many heaps, had perhaps been gradually built in fresh cinders and ashes; and the waters running down from the interior mountain in the dry season had smoothened every thing in their way, and filled up by degrees the cavity of the crater. The rocky black lava was the residence of numberless men-of-war birds and boobies, which we saw their eggs, and suffered us to come close to them. About 8 in the evening, it being then very dark, a small vessel came into the bay, and stood directly within us. Captain Cook having asked her repeatedly, received in answer that she was the *Lucretia*, a New-York sloop, which had been at Sierra Leon, and was now come to catch slaves, in order to sell them at the windward islands of the West Indies. A lieutenant was sent on board, who learned from the master, that he had taken our ship to be a French Indiaman, and was very desirous of trading with English India-ships, in which he was disappointed by the company's regulations. He dined with our officers the next day, but on the 31st at day-break left the island. On the 30th in the morning, we landed at a late time; and, crossing the plain, arrived at a promontory of lava-current, intersected by many channels six to eight yards deep, which bore strong evidence of being worn by vast torrents of water, and were at present perfectly dry, the sun being in the northern hemisphere. In these gullies we found a small quantity of soil consisting of a black micaceous earth, mixed with some whitish particles to the touch. Here we saw some small bushes of purslane, and a species of grass (*Panicum guineum*) which found sufficient nutriment in the dry soil. Having at last, with great fatigue, passed over this extensive and tremendous current of lava, which was much more solid than the sand nearer to the sea, we came to the foot of the Green Mountain, which even from the ships in the bay we had plainly distinguished to be of a different nature from all the rest of the country. Those parts of the lava which surrounded it were covered with a prodigious quantity of purslane, and a kind of new fern (*Lonchites Adscensionis*), where several flocks of wild goats were feeding. The great mountain is divided in its extremities, by various clefts, into several bodies; but in the centre they all run together, and form one mass of great height. The whole appears to consist of a gritty tephaceous lime-stone, which has never been attacked by the volcano, but probably existed prior to its eruption; its sides are covered with a kind of grass, peculiar to the island, which Linnæus has named *aristida Adscensionis*. We likewise observed several flocks of goats feeding on it; but they were all excessively shy, and with surprising velocity along tremendous precipices, where it was impossible to follow them. The master of the New-York sloop acquainted us, that there is a spring of water on one part of this mountain, which falls down a great precipice, and

is afterwards absorbed in the sand. I am almost persuaded, that, with a little trouble, Ascension might shortly be made fit for the residence of men. The introduction of furze (*Ulex Europæus*), and of a few other plants which thrive best in a parched soil, and are not likely to be attacked by rats or goats, would soon have the same effect as at St Helena. The moisture attracted from the atmosphere by the high mountains in the centre of the island, would then no longer be evaporated by the violent action of the sun, but collect into rivulets, and gradually supply the whole island. A soil of grasses would every where cover the surface of the ground, and annually increase the stratum of mould, till it could be planted with more useful vegetables. We returned gradually to Cross Bay, in the heat of noon, over the plain; having a space of more than 5 miles to traverse, where the sun burnt and blistered our faces and necks, and heated the soil to such a degree, that our feet were likewise extremely sore. About 3 o'clock we arrived at the water's side; and after bathing in a small cove among a few rocks, we made the signal for a boat, and were taken on board. The next forenoon we made another small excursion, in company with Captain Cook, towards the Green Mountain; but we were all of us so much fatigued, that we could not reach it. We made no new observations in the course of this day, the nature of the island being dreary beyond description in its outskirts."—The East India ships often touch at this island, as it has a safe harbour, and take in quantities of turtle, which are very plentiful in it. Long. 17. 20. W. Lat. 7. 5. S.

(4.) * ASCENSION DAY. The day on which the ascension of our Saviour is commemorated, commonly called Holy Thursday; the Thursday but one before Whitsuntide.

(1.) * ASCENSIONAL DIFFERENCE, is the difference between the right and oblique ascension of the same point to the surface of the sphere. *Chambers*.

(2.) ASCENSIONAL DIFFERENCE of the sun, converted into time, is just so much as he rises before or after six o'clock.

* ASCENSIVE. *adj.* [from *ascend*.] In a state of ascent: not in use.—The cold augments when the days begin to encrease, though the sun be then *ascensive*, and returning from the winter tropick. *Brown's Vulgar Errors*.

ASCENSORIUM, in ancient writings, a stair, or step.

* (1.) ASCENT. *n. f.* [*ascensus*, Lat.] 1. Rise; the act of rising; the act of mounting.—

To him with swift *ascent* he up return'd,
Into his blissful bosom reassum'd

In glory, as of old.

Milton.

2. The way by which one ascends.—The temple, and the several degrees *ascent*, whereby men did climb up to the lame, as if it had been a *scala cæli*, be all poetical and fabulous. *Baron*.—

It was a rock

Conspicuous far; winding with one *ascent*

Accessible from earth, one entrance high. *Milt.*

3. An eminence, or high place.—

No land like Italy erects the sight,

By such a vast *ascent*, or swells to such a height.

Adams.

was employed as preceptor to her Majesty in the Greek and Latin languages. He died in 1568, not rich, but much regretted, especially by the Queen, who said she had rather lost L. 10,000. He wrote, 1. *Toxophilus*. The scholæ or partitions of shooting, contained in two bookes, written by Roger Ascham, 1544, and now newly perished. Pleasaunt for all gentlemen and yeomen of England, &c. Lond. 1571. Whilst at the university he was fond of archery by way of exercise and amusement; for which he was censured; and on account he sat down to write this book, which is dedicated to Hen. VIII. who settled a pension of L. 10 per annum upon the author. It is rather whimsical; but it is admirably well written, and full of learning. 2. A report and discourse, of the affairs and state of Germany, and the Emperour Charles his court, &c. 4to. A valuable curiosity. 3. The schoolmaster. First printed in 1573, by Mr Upton published an edition with notes in 1711. It has uncommon merit, and is also expressive of the great humanity of the author, who is for making the paths of knowledge as pleasant as possible, and for trying every gentle method of enlarging the mind and winning the heart. Latin epistles; first published by Mr Grant in 1616; and since passed in many editions: the best edition of Oxford in 1703. It is much admired for account of the style, and esteemed almost the best classical work of that kind written by an Englishman. 5. *Apologia contra missam*. 1577, 8vo. ASCHARIANS, or } the followers of Asch-
ASCHARIIONS, } rius, a sect of Mahometans.

ASCHARIUS, a celebrated Mahometan Doctor. ASCHERLEBEN, a town of Anhalt, seated on the river Eine, and built out of the ruins of the ancient ASCANIA.

ASCHIA, in ichthyology, the grayling.

ASCHIBOBUCH, a bird in Madagascar, which has been supposed to void Ambergris. See AMBERGRIS, § 1.

ASCHILLIUS, king of the Dacians, one of the monarchs, who is said to have assisted king Darius in his wars.

1.) ASCIA, in antiquity, an instrument supposed of the ax kind, used in the fabric of the Roman tombs, and frequently represented on them. The formula *sub ascia dedicari*, is frequently found inscribed on ancient tomb stones. We also meet with *regum ascia ne poleito*, among the antiquities of the Twelve Tables.

2.) ASCIA, in surgery, a kind of bandage; somewhat oblique, or crooked; whose form and use are described by Scultetus, in his *Armatum*.

ASCIBURGIUM, in ancient geography, supposed to be one of the 50 citadels built on the Rhine; mentioned by Tacitus, who adds, some imagine it was built by Ulysses. Here was a Roman camp and a garrison. To its situation on the banks of the Rhine answers a small hamlet, now called ASBURG.

ASCIDIA, a genus of animals belonging to the class of vermes mollusca. The body is cylindrical, and fixed to a shell, rock, &c. It has two apertures; one on the summit, the other lower,

forming a sheath. There are 6 species of this animal, viz.

1. ASCIDIA ECHINATA,
2. ASCIDIA GELATINOSUM,
3. ASCIDIA INTESTINALIS,
4. ASCIDIA PAPILLOSUM,
5. ASCIDIA QUADRIDENTATA,
6. ASCIDIA RUSTICA;

Only one of which, viz. the Rustica, (See PLATE XIII fig. 9.) is found in

the British seas. Animals of this genus have the faculty of squirting out the water they take in. The expansion and contraction of other bodies occasion their assuming various forms.

* ASCII. *n. s.* It has no singular. [from *as*, without, and *scia*, a shadow.] Those people who, at certain times of the year, have no shadow at noon; such are the inhabitants of the torrid zone, because they have the sun twice a-year vertical to them. *Diſt.*

ASCINDOE, in botany, a name given by the people of Guinea to a shrub, which they use in medicine, boiling it in water, and giving the decoction in gonorrhœas, and the like complaints. Petiver has named it the *prickly Guinea shrub*, with roundish crenated leaves, and filamentous flowers. The leaves are about an inch wide, and about an inch and a half long; they stand on a short foot-stalks; and at the ends of the branches, there stand clusters of staminate flowers. The thorns on the large branches are very strong.

(1.) ASCITÆ, [from *ascos*, a bag, or bottle,] in antiquity, a sect of Montanists, who appeared in the 2d century; so named, because they introduced a kind of Bacchanals into their assemblies, who danced round a bag or skin blown up; saying, they were those new bottles filled with new wine whereof our Saviour makes mention, Matth. ix. 17.—They are sometimes also called ASCODROGITE.

(2.) ASCITÆ, a tribe of Arabs. See ARABIA, § 5.

(1.) * ASCITES. *n. s.* [from *ascos*, a bladder.] A particular species of dropsy; a swelling of the lower belly and depending parts, from an extravasation and collection of water broke out of its proper vessels. This case, when certain and inveterate, is universally allowed to admit of no cure but by means of the manual operation of tapping. *Quincy*.—There are two kinds of dropsy, the anasarca, called also leucophlegmacy, when the extravasated matter swims in the cells of the membrana adiposa; and the *ascites*, when the water possesses the cavity of the abdomen. *Sharp's Surgery*.

(2.) ASCITES. See MEDICINE, INDEX.

* ASCITICAL. } *adj.* [from *ascites*.] Belonging to an ascites; dropical; hydropical.—When it is part of another tumour, it is hydropical, either anasarca or *ascitical*. *Wise-man's Surgery*.

* ASCITITIOUS. *adj.* [*ascititius*, Lat.] Supplemental; additional; not inherent; not original.—Homer has been reckoned an *ascititious* name, from some accident of his life. *Pope*.

ASCLEPIA, a festival of Æsculapius the god of physic, observed particularly at Epidaurus, where it was attended with a contest between the poets and musicians, whence it was likewise called *Agon*, the sacred contention.

ASCLEP.

ired at the ASCOLIA, wherein the young peasants kept themselves always on one foot, whilst the other was suspended in the air, and by their frequent falls, gave diversion to the spectators. He it held the sport longest, and made the largest leaps, was the conqueror.

ASCOMANNI, pirates who used bridges or boats made of leather.

ASCOME, a village of Westmoreland.

ASCONIUS PEDIANUS, an ancient grammarian of Padua, and according to Servius, an acquaintance of Virgil's. He wrote commentaries on Cicero's Orations, fragments of which are published in several editions of Cicero's works.

ASCOT, the name of 6 English villages, viz. 1. Bucks near Winslow: 2. in Middlesex, between Slip, and Pinner-Green: 3. and 4. in Oxfordshire, near Shirehampton Thame: 5. in Warwickshire, S. of Ladbroke; and, 6. in the same, near Richford.

ASCOT-HEATH, a small town 4 miles from Windsor.

ASCOUGH, William, L. L. D. was appointed Bishop of Salisbury in 1438, and soon after contrary to king Henry VI. About 12 years afterwards he was murdered by the famous rebel Jack Cade and his followers, who after plundering his house, fell upon him the next day, while he was sitting at the altar, in Edington, Lincolnshire, dragging him to a neighbouring hill, dashed his brains, on the 29th June, 1450.

ASCRA, a village of ancient Greece near mount Helicon, the birth place of the poet Hesiod.

ASCRIBABLE. *adj.* [from *ascribo*.] That which may be ascribed.—The greater part have been forward to reject it, upon a mistaken persuasion, that those phenomena are the effect of nature's abhorrence of a vacuum, which seem to be entirely *ascribable* to the weight and spring of air. *Boyle*.

To ASCRIBE. *v. a.* [*ascribo*, Lat.] 1. To attribute to as a cause.—The cause of his banishment is unknown, because he was unwilling to provoke the emperor, by *ascribing* it to any other reason than what was pretended. *Dryden*.—To this we justly *ascribe* those jealousies, and encroachments, which render mankind uneasy to one another; *Rogers*. 2. To attribute as a quality to person, or accident to substance.—These perfections must be somewhere, and therefore may much better be *ascribed* to God, in whom we supposed all other perfections to meet, than to any thing else. *Tillotson*.

ASCRIPTI, or ADSCRIPTI, in antiquity, those who entered their names in the colonies, and became COLONI.

ASCRPTION. *n. s.* [*ascriptio*, Lat.] The act of ascribing. *Diſt.*

1.) ASCRIPTITII, or ADSCRIPITII, in ancient barbarous customs, were a kind of villains, who coming from abroad, settled in the lands of a new Lord, whose subjects or servants they were annexed; being so annexed to the lands, that they might be transferred and sold with them. *Ascriptitii* is sometimes also used in speaking of natives or foreigners newly admitted to the freedom of a city or country.

VOL. II. PART II.

(2.) ASCRIPTITII was used in the military laws for the recruits to supply the legions, called also ACCENSI.

* ASCRIPTITIOUS. *adj.* [*ascriptitius*, Lat.] That which is ascribed. *Diſt.*

ASCRIPTIVI, the same with ASCRIPTITII.

ASCRIVIUM, in ancient geography, a town of Dalmatia, on the Sinus Rhizicus, now called CATTARO, the capital of the territory of Cattaro, in Venetian Dalmatia. Long. 19. 20. E. Lat. 45. 25. N.

(1.) ASCULUM APULUM, in ancient geography, a town of Apulia, mentioned in the war with Pyrrhus, by Florus and Plutarch; now called ASCOLI. See No 2.

(2.) ASCULUM PICENUM, in ancient geography, the capital of the Piceni, mentioned by Cæsar, Florus, &c. and now called ASCOLI. See No 1.

ASCUS, in natural history, a word used by De Laet, for the pouch or bag which nature has given the opossum, for receiving its young ones in time of danger. This *ascus* is a skinny bag, separate from the rest of the body, but adhering by a membrane to the bottom of the belly.

ASCYRUM, PETER'S WORT: A genus of the polyandria order, belonging to the polyadelphia class of plants; and in the natural method ranking under the 20th order, Rotaceæ. The calyx consists of 4 leaves; the corolla has 4 petals; the filaments are numerous, and divided into 4 bundles. There are 3 species; viz.

1. ASCYRUM CRUX ANDRÆ, } all natives of
 2. ASCYRUM HYPERICOIDES, } the West In-
 3. ASCYRUM VILLOSUM, } dies or America,
- but possessing no property hitherto discovered.

ASDHAS, a river of Turkey in Europe.

ASDRUBAL, the name of several Carthaginian generals. See CARTHAGE.

ASED-ABAD. See ASAD-ABAD.

ASEER, or ASEERGUR, } a strong fort of the Soubah of Candish, in Deccan, 20 miles N. E. of Burhampour. Long. 76. 0. E. Lat. 21. 35. N.

ASEKAI, } the name which the Turks give to ASEKI, } the favourite sultaneſſes who have brought forth sons. These are greatly distinguished above others, in their apartments, attendants, pensions, and honours. They have sometimes shared the government. The sultana who first presents the emperor with a male child, is reckoned the chief favourite, is called *nuyuk aseki*, and ranks as a legitimate wife: though, from the time of Bajazet I. the sultans are forbid to marry by a public law, which Solyman II. broke through for the sake of Roxalana.

ASELELAPPMARKK. See ANGERMANNSLAND.

(1.) ASELLI, in astronomy, two fixed stars of the 4th magnitude, in the constellation Cancer.

(2.) ASELLI, in entomology, is used for millepedes.

ASELLUS, in zoology, a species of oniscus. See ONISCUS.

ASEMUS, [from a negative, and *μῆναι*, a sign,] is an epithet applied to events that fall out contrary to all appearance, and without any manifest cause.

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Z. A.

ASHBY-CHILDS, a village in Lincolnshire.

ASHBY-COLD, a small town in Northamptonshire, 2 miles N. W. of Naseby.

ASHBY-DE-LA-ZOUCH, a town in Leicestershire, so called from the Zouches, its ancient lords, 13 miles S. of Derby, 15 from Leicester, 115 from London. It has 7 fairs, viz. on St. Andrew's and St. Jude's days, and 28 Oct. and is stocked with excellent horses. It had a castle which was long in the possession of the family de Zouch. It afterwards fell into the hands of Richard IV. who granted it to Sir Edward Hastings, with the title of a baron, and licence to build a castle of the manor house, to which he added a very high tower. It was demolished 1448; but a great part of the tower is still standing. It now belongs to the earl of Huntingdon. Long. 0. 52. W. Lat. 51. 4. N.

ASHBY-FOLVILLE, a village in Leicestershire, between Billisden and Melton Mowbray.

ASHBY-FRIERS, a small town near Dorchester.

ASHBY-LEDGERS, a village near Daventry.

ASHBY MAGNA, and PARVA, two villages of Leicestershire, about 5 miles N. and N. E. of Leicester.

ASHBY-MEERS, a village in Northamptonshire, between Overston and Wellingsborough.

ASHBY-PARVA. See ASHBY MAGNA.

ASH-CHAPELRY, a village 4 miles N. W. of Leicester.

ASH-CHURCH, a village, 2 miles from Tewkesbury.

ASH-COLOURED. *adj.* [from *ash* and *colour*.] Said of a colour between brown and grey, like the bark of an aspen branch.—Clay, *ash-coloured*, was part of the stratum which lay above the strata of stone. See *word on Fossils*.

ASH-COMB, a village in Devonshire, near Exeter.

ASHCROFT, a village, near Hartland, Devonshire.

ASHDOD, or AZOTUS. See AZOTUS.

ASHDON, 2 villages in Essex; viz. 1. on the borders of Cambridgeshire, 3 miles N. E. of Saffordbury; and 2. on the borders of Suffolk.

ASHDOWN, 1. a small town in Berkshire, 10 miles E. of Reading; 2. a place in Essex, anciently called Ashdown, or the hill of asses, famous for the battle of Edmund Ironside by Canute the Dane.

ASHE, a village in Suffolk near Wickham.

ASHE-BIGOD, or } a small town in Suffolk, near

ASHE-BOCKING, } Bradley and Needham.

SHELDON, a village in Essex, near Dengy.

SHELE, a small town in Norfolk between Thetford and Swaffham.

SHELOWORTH, two villages in Gloucestershire, 1. near Berkeley; and 2. near Lassingdon.

ASHEN. *adj.* [from *ash*.] Made of ash wood.

At once he said, and threw
His *ashen* spear; which quiver'd as it flew. *Dryd.*

ASHENBROKE, a village near Litchfield, in Warwickshire.

ASHENDEN; } two villages; viz. 1. in Bucks,

ASHENDON; } 8 miles N. W. of Aylesbury;

2. near Dorchester.

ASHENHURST, a small town in Staffordshire, 10 miles E. of Leek.

ASHEPOO, a river of S. Carolina, which rises in Charlestown district, and running S. by E. enters St Helena Sound by two channels, on the W. side of Fenwick's Island. It is navigable by boats for 10 or 12 miles.

(1.) ASHER, [אַשֶׁר, Heb. *i. e.* blessedness;] one of Jacob's sons by Zilpah, and the progenitor of the tribe so called. See N° 2.

(2.) ASHER, a numerous tribe of the Israelites, who possessed a fertile region in the N. W. of Canaan; but whose courage was not proportionate to their numbers, as they suffered the Canaanites, whom they were commanded to extirpate, to retain many cities in their neighbourhood, and tamely submitted to the oppressions of the Canaanitish tyrant, Jabin. They, however, assisted Gideon, in his pursuit of the Midianites; 40,000 of them, expert warriors, attended David at his coronation, and many of them joined Hezekiah, in his reform.

(3.) ASHER, a village near Pevensey, Suffex.

ASHERST, a village near Turnbridge.

ASHERTON, a village in Wiltshire.

(1.) * ASHES. *n. s.* wants the singular. [*asca*, Sax. *asche*, Dutch.] 1. The remains of any thing burnt.—Some relics would be left of it, as when *ashes* remain of burned bodies. *Digby on Bodies*.—

This late dissension, grown betwixt the peers,
Burns under feigned *ashes* of forged love,

And will at last break out into a flame.

Shakesp. Henry VI.

—*Ashes* contain a very fertile salt, and are the best manure for cold lands, if kept dry, that the rain doth not wash away their salt. *Mortimer's Husbandry*. 2. The remains of the body; often used in poetry for the carcase, from the ancient practice of burning the dead.—

Poor key-cold figure of a holy king!

Pale *ashes* of the house of Lancaster!

Thou bloodless remnant of that royal blood!

Shakespeare

To great Laertes I bequeath

A task of grief, his ornaments of death;

Left, when the fates his royal *ashes* claim,

The Grecian matrons taint my spotless name.

Pope.

(2.) ASHES, among the ancient Persians, were used as an instrument of punishment for some great criminals. The criminal was thrown headlong from a tower 50 cubits high, which was filled with ashes to a particular height, (2 Mac. xiii. 5, 6.) The motion which the criminal used to disengage himself from this place, plunged him still deeper into it; and this agitation was farther increased by a wheel which stirred the ashes continually about him till at last he was stifled.

(3.) ASHES, in chemistry, the earthy particles of combustible substances after they have been burnt. If the ashes are produced from vegetable bodies, they contain a considerable quantity of fixed salt, blended with the terrene particles: and from these ashes the fixed alkaline salts called *potash*, *pearl-ash*, &c. are extracted. See POTASH, &c. The ashes of all vegetables are vitrifiable, and found to contain iron.—They are also an excellent manure for cold and wet grounds. See HUSBANDRY, INDEX.

(4.) ASHES were anciently used in several religious ceremonies. St Jerome relates, that the



Long. 0. 52. E. Lat. 51. 4. N

(2-5) **ASHFORD**, four villages, viz. 1. six miles N. of Barnstaple, 2. a little W. of Uffculme; both in Devonshire, 3. in the High Peak of Derby; and, 4. in Middlesex, near Stoney.

ASHFORD-BIWOLEY, a village S. of Ludlow.

ASHFORD CARRELL, a village, E. of Ludlow.

ASHGATE, a village, near Oakham, Rutland.

ASH HOLE, among chemists, is the lowest part of a furnace; and is so called to receive the ashes falling from the fire, and to give a passage to the Sir which is to be introduced into the furnace, to keep up the combustion.

ASH, a prince of Norway, slain by Fingal, the father of Ossian, at a place in Inverness-shire, ever since, named *Drumash*, or *ASH*'s HILL.

ASHILL, a village in Somersetshire, a miles from Ilminster, and 4 from Taunton. Its fairs are, on Easter Wednesday, and 18 Wed. after 8 Sept.

ASHUMA, an idol of the Samaritans, (a Kings xviii. 30. said to have been formed like a lion, or a goat, and to have represented the sun.

ASHUNDJON, a village in Essex, 3 miles from Rochester.

ASHINGTON, a village in Suffolk, 10 miles from Norwich, which has a fair on 2d July.

ASH, a village in Suffolk, 10 miles from Norwich, which has a fair on 2d July.

ASHUKEN, the eldest son of Gomer, and grandson of Japhet, said to have been the progenitor of the Germans, and Phrygians.

ASHKIRK, a parish of Scotland, situated in the county of Roxburgh and Seaborne, but chiefly in the former, 7 miles in length and 3 in breadth. By Mr Haliburton, the minister's report to Sir J. Sinclair, it contained 2,9 souls, in 1792, which was 90 fewer than it had in 1755. The rent of land, however, had increased about a fourth within 10 years preceding 1792. The number of horses was 100, and that of black cattle 222. The parish is hilly, but the hills are green to their tops,

and 9. on the Wiltshire, both in Staffordshire, N. W. of Ludlow, and, 11. in Wiltshire, near Marlbury.

ASHLEY-BARN, a village in Gloucestershire, near Bristol.

ASHLEY-GREEN, a village near Chesham.

ASHLING, EAST, } two villages in

ASHLING, WEST, } near Chichester.

have a fair 21st July.

ASHLINGTON, a small town in Wiltshire.

ASHEY, a river of S. Carolina, which empties into Charleston Harbour, and, after running S. S. E. 20 miles, turns gradually S. S. E. passes by Chichester, and falls in Charleston harbour.

ASHMAN-HALL, a village in Norfolk.

ASHMANSWORTH, a small town in

Wiltshire, W. of Southampton.

ASHMOLE, Lion, a great antiquary

and scholar, founder of the Ashmolean museum

at Oxford, was born at Litchfield in Staffordshire.

In the early part of his life, he practised

law; and in the civil war had a captain's

commission, and afterwards was employed by

Charles I. He married lady Blount, daughter

of the Earl of Devon, and was afterwards

appointed by most of the learned men of the

time, a diligent collector of manuscripts.

In 1650, he published a treatise

by Dr Arthur Dee, relating to the philosophy

of the stones, with another treatise on the same

subject, by an unknown author. About 1650

he was busied in preparing for the press a

collection of the works of each English

author, which had then remained in manuscript.

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collection of the works of each English

study of antiquity and records. He was at great pains to trace the Roman road, which in Antoninus's Itinerary is called BENNEVANNA, from Weedon to Litchfield, of which he gave Mr Dugdale an account in a letter. In 1658, he began to collect materials for his history of the order of the garter, which he lived to finish. In September following, he made a journey to Oxford, where he set about giving a full and particular description of the coins presented to the public library by Archbishop Laud. Upon the restoration, Mr Ashmole was introduced to king Charles II. who bestowed on him the place of Windsor herald. Soon after, he appointed him to give a description of his medals, which were accordingly delivered into his possession, and King Hen. VIII's closet was assigned for his use. Mr Ashmole was afterwards admitted a fellow of the royal society; and the king appointed him secretary of Surinam, in the West Indies. On the 19th July 1669, the university of Oxford, in consideration of the many favours they had received from Mr Ashmole, created him M. D. by diploma, which was presented to him by Dr Yates, principal of Brazen-Nose college. On the 8th of May 1672, he presented his "Institution, laws, and ceremonies of the order of the garter," to the king; who as a mark of his approbation, granted him 400l. out of the custom of paper. On the 26th of January 1679, fire broke out in the Middle Temple, in the next chamber to Mr Ashmole's, by which he lost his noble library, with a collection of 9000 coins, ancient and modern, and a vast repository of seals, charters, and other antiquities and curiosities; with his manuscripts and his most valuable gold medals were luckily at his house at Lambeth. In 1683, the university of Oxford having finished a magnificent repository near the theatre, Mr Ashmole sent thither his collection of rarities; which collection was augmented by the addition of his manuscripts and library at his death, which happened at Lambeth, May 18, 1692, in the 76th year of his age. Besides the works above mentioned, Mr Ashmole left several which were published since his death, and some which remain still in manuscript.

ASHMOLEAN MUSEUM. See last article.

ASHMORE, a village in Dorsetshire, two miles from Milton Abbas.

ASHMORE-BROOKE, a small town in Staffordshire, near Litchfield.

ASHOLT, a village in Somersetshire between Bridgewater and Stokegomer.

*ASHORE. *adv.* [from *a* and *shore*.] 1. On shore; on the land.—The poor Englishman riding in the boat, having all that he brought thither *ashore*, would have been undone. *Raleigh*. 2. To the shore; to the land.—

We may as bootless spend our vain command,
As send our precepts to the leviathan

To come *ashore*. *Shakesp. Hen. V.*

May thy billows rowl *ashore*

The beryl and the golden ore. *Milton's Comus*.

Moor'd in a Chian creek, *ashore* I went,

And all the following night in Chios spent.

Adelphon's Ovid.

ASHORNE, a village in Warwickshire, near Leamington.

ASHOVER, a village in Derbyshire, near Mil-town and the Amber, which has fairs, 25 April, and 15 October.

ASHOW, a village in Warwickshire near Stone-ly.

ASHPENAZ, the governor of Nebuchadnezzar's eunuchs. See Dan. i. 3.

ASHPOL, a village near Manchester.

ASHPRINGTON, a small town in Devonshire, N. of the Hareborn, where it joins the Dart.

ASH PRIORS, a village near Wivelcomb.

ASH REGIS, or KING'S ASH, a village in Devonshire near Tauton.

ASHRIDGE, a small town of Hertfordshire, 3 miles from Berkhamstead

ASHTAROTH, ASHTORETH, [אשתרת, Heb. *i. e.* flocks, or riches,] or ASTARTE, the chief goddess of the Sidonians and Phœnicians, called also the Queen of Heaven, and reckoned the same with the Juno of the Greeks and Romans. Cicero, however, calls her the Venus of Syria, wherein he is certainly justified by her mode of worship; which, like that of the Grecian Venus, abounded in all manner of debauchery. The Israelites in all their relapses to idolatry showed a great fondness for her worship. Solomon himself in his dotage sacrificed to her. It must indeed be owned, it was at least more *natural* than the cruel and murderous worship of Moloch. But it is astonishing that any *female* sovereign should have had the impudence to patronize it; which, however, was openly done by Ahab's *chaste* queen, Jezebel, who appointed 400 priests for her service. She was represented in various habits, encircled with rays, &c. Her worship appears to have been very ancient, as we find a place named after her in the days of Abraham. Ashtaroth was also worshipped by the Philistines, in whose mythology she was ranked as the sister of Dagon. See next article.

ASHTAROTH-KARNAIM, an ancient city of the Canaanites, famous for Chedorlaomer's victory over the Renhaims, (Gen. xiv. 5.) as well as for being the residence of Og king of Bashan. (Deut. i. 4.) It was situated 6 miles from Edrei, E. of Jordan; and fell to the lot of the half tribe of Manasseh.

* ASHTED, a village in Surry, near Epsom.

(1.) ASHTON, Charles, a great antiquarian and one of the most learned critics of his age, was elected Master of Jesus College, Cambridge, July 5th 1701, and installed prebend of Ely, on the 14th. His skill in ecclesiastical antiquities was equalled by few and excelled by none; as his remarks on the fathers, and corrections of the mistakes of translators evidence

(2.) ASHTON, Dr Thomas, a native of Eton, studied at Cambridge, in 1733, was successively rector of Aldingham, Stannister, and St Botolph, Bishopsgate. In 1759 he took his degree of D. D. married Miss Amyand, in 1760, and in May 1762 was elected preacher at Lincoln's Inn, which he resigned in 1764. He died in 1775, aged 59. His discourses were admirable and his delivery excellent. He published, 1. A volume of Sermons; 2. a Dissertation on II. Peter. i. 9.—3. A letter to the Revd. Mr Jones. 4 & 5 Two Letters to Dr Morell, on electing aliens into places

ees in Eton College; and 6 An Extract from the case of the obligation of electors, &c.

(3.) ASHTON, the name of 16 English villages; viz. 1, 2 and 3. in Cheshire, near Frodsham, Kelsal and Namptwich: 4. in Devonshire, near Chumleigh; 5. six miles from Exeter: 6. in Herefordshire, near Orlton: 7. at the confluence of the Conder and Lune; 8. in Makersfield, near W. Darby; and 9. near Warrington, all 3 in Lancashire: 10. in Northamptonshire, near Grafton; 11. in Oundel; 12. near Peterborough: 13. in Shropshire, near Wem: 14. in Somersetshire, 2 miles from Glastonbury: 15. EAST, and 16 WEST in Wiltshire, near N. Bradley. Ashton also makes part of the name of other 12 villages; viz.

1. ASHTON CANTLOW, a village E. of Aulcester.

2 & 3. ASHTON-CHAPEL, 1. in Cheshire, N. of the Weever, opposite to Frodsham: 2. in Leign, Lancashire.

4. ASHTON-GIFFORD, in Wiltshire, near Heytesbury.

5. ASHTON-GRANGE, in Cheshire, W. of Ashton Chapel.

6. & 7. ASHTON-HALL, 1. in Cheshire, near Ashton Grange: and 2. near Lancaster.

8. ASHTON-IN-THE-WALL, in Northamptonsh. near Chipping-Warden.

9. ASHTON-KEYNS, 3 miles W. of Cricklade.

10. ASHTON-UNDER-HILL, in Gloucestersh.

11. ASHTON UNDER LINE, 6 miles from Manchester, seated on the Taume, between Claton-Hall and Shawley Hall. It has fairs Aug. 5, and Dec. 3.

12. ASHTON UPON CURRAN, near Evesham.

ASHTORETH. See ASHTAROTH.

ASHUELOT, a river of the United States, in New Hampshire, formed by a great number of streams which flow from ponds in Cheshire county, and unite at Swanfy; when running S. W. it falls into Connecticut river, 4 miles N. of Massachusetts.

ASHUR, [אַשּׁוּר, Heb. i. e. blessed,] the son of Shem, and progenitor of the Assyrians.

ASHURIM, or } The ancient Assyrians, so called
ASHURITES, } led in Scripture.

ASHURST, the name of 3 villages; viz. 1. between Ormskirk and Wigan, Lancashire: 2. in Suffex near Bramber; and, 3. near Pevensey.

ASHWATER, in Devonshire, near Tavistock.

* ASHWEDNESDAY. *n. f.* The first day of Lent, so called from the ancient custom of sprinkling ashes on the head.

* ASHWEED. *n. f.* [from *ash* and *weed*.] An herb.

(1.) ASHWELL, George, rector of Hanwell, son of Robert Ashwell of Harrow, was born at London, in 1612, and admitted in Wadham College, Oxford, in 1627, where he took his degrees of A. M. and B. D. and was elected a fellow and tutor. During the rebellion he preached several times before the king and parliament. He died at Hanwell, in 1693, with the character of a religious, learned, and peaceable divine. He wrote, 1. A Discourse, asserting the received authors, and authority of the Apostles Creed. Oxon. 1653. 2. A double Appendix, touching the Athanasian and Nicene Creeds. 3. On the Gesture at receiving the Sacrament. 1663. 4. A Treatise con-

cerning Socinus, and the Socinian Heresy. 5. A Dissertation on the Church of Rome. Ox. 1666. And an answer to Plato Redivivus; besides translations.

(2.) ASHWELL, the name of 3 villages; viz. 1. in Hertfordshire, near Caldicot on the Rhe: 2. in Northamptonshire, 2 miles from Brackley; and 3. in Rutlandshire, on the W.

ASHWELL-THORP, a village in Norfolk, near Wymondham.

ASHWICK, a small town in Somersetshire, near Kilmerden.

ASHWOOD, a village in Staffordshire.

ASHWORTH CHAPEL, a small town in Lancashire, W. of Rochdale.

* ASHY. *adj.* [from *a/b*.] Ash-coloured; pale, inclining to a whitish grey.—

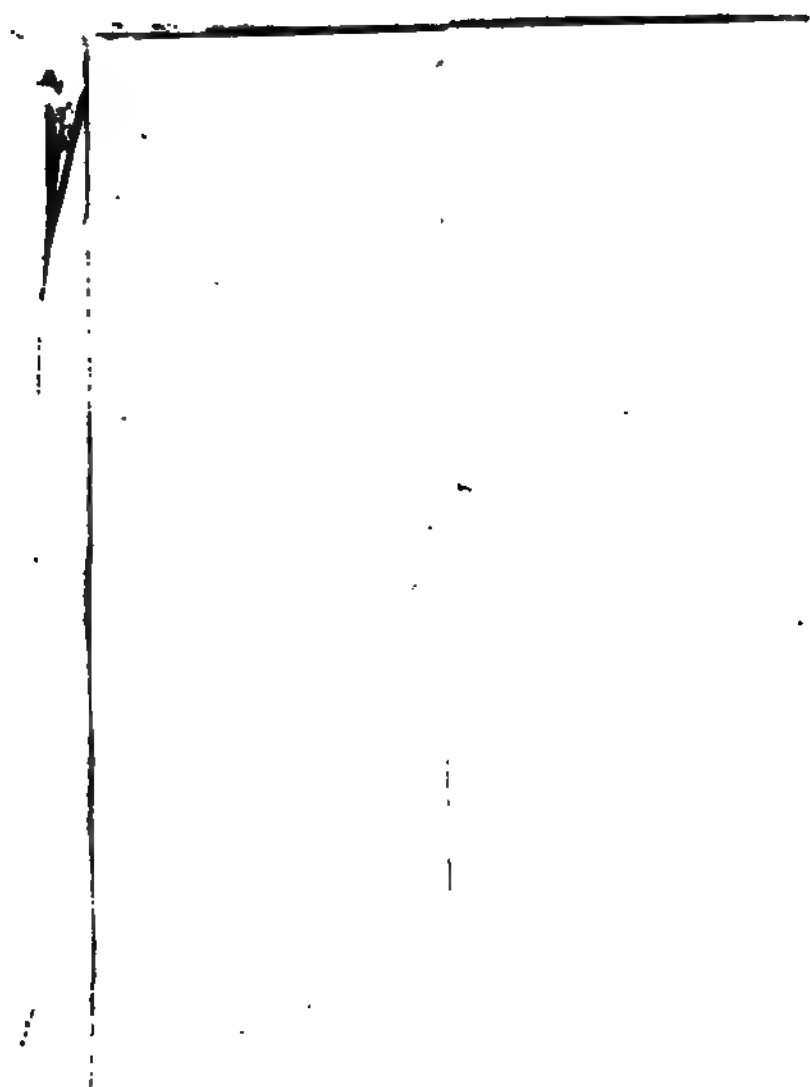
Of a/ by semblance, meagre, pale, and blefless.

(I. 1.) ASIA, BOUNDARIES AND EXTENT. Asia is 1 of the 3 general divisions of our continent, and one of the four of the whole earth. It is separated from Europe by the Mediterranean sea, the Archipelago, the Black Sea, the Bosporus Meotis, the Don, and the Dwina, which fall into the White Sea; and from Africa, by the Arabian Gulph, or Red Sea, and the Isthmus of Suez. All the other parts are surrounded by the ocean. The late discoveries show that it does not join to America, though it extends very near it. See AMERICA, § 2. It is situated between 23° and 196° long. E. and 1° and 74° lat. N. From the Dardanelles to the most eastern shore of Tartary, it is 4740 miles in length; and from the most southern point of Malacca to the most northern point of Nova Zembla, it is 4380 miles in breadth.

(2.) ASIA, DIVISIONS, &c. OF. Asia may be divided into the following parts: Turkey in Asia, Arabia, Persia, the Mogul's empire, with the peninsulas of the Indies; Tibet, China, and Corea; Great and Little Buckaria, with Korum, Tartary, Siberia, and the islands. The principal languages spoken in Asia are, the modern Greek, the Turkish, the Russian, the Tartarian, the Persian, the Arabic, the Malayan, the Chinese, and the Japanese. The European languages are not spoken upon the coasts of India and China. Asia is looked upon as that part of the world which, of all others, has been most peculiarly distinguished by heaven. There it was the first man was created; there the patriarchs lived, the law was given to Moses, and the greatest and most celebrated monarchies were formed; from thence the first founders of cities and nations in other quarters of the world brought their colonies. Later in Asia Jesus Christ appeared: there it was that he wrought the salvation of mankind, that he died and rose again; and from thence it is that the light of the gospel was diffused over all the world. Laws, arts, sciences, and religion, almost all had their original in Asia.

(3.) ASIA, GOVERNMENT, AND RELIGIONS. This vast extent of territory was successively governed in past times by the Assyrians, the Medes, the Persians, and the Greeks; but the immense regions of India and China were little known to

Alexander.



Alexander, or the conquerors of the ancient world. Upon the decline of those empires, great part of Asia submitted to the Roman arms; and afterwards, in the middle ages, the successors of Mahomet, or, as they are usually called, Saracens, founded in Asia, in Africa, and in Europe, a more extensive empire than that of Cyrus, Alexander, or even the Roman when in its height of power. The Saracen greatness ended with the death of Tamerlane; and the Turks, conquerors on every side, took possession of the middle regions of Asia, which they still enjoy. Besides the countries possessed by the Turks and Russians, Asia contains at present three large empires, the Chinese, the Mogul, and the Persian; upon which the lesser kingdoms and sovereignties of Asia generally depend. The prevailing form of government in this division of the globe is absolute monarchy. If any of them can be said to enjoy some share of liberty, it is the wandering tribes, as the Tartars and Arabs. Many of the Asiatic nations, when the Dutch first came among them, could not conceive how it was possible for any people to live under any other form of government than that of a despotic monarch. Turkey, Arabia, Persia, part of Tartary, and part of India, profess Mahometanism. The Persian and Indian Mahometans are of the sect of Hassan and the others of that of Omar; but both own Mahomet for their law-giver, and the Koran for their rule of faith and life. In the other parts of Tartary, India, China, Japan, and the Asiatic islands, they are generally heathens and idolaters. Jews are to be found every where in Asia. Christianity, though planted here with wonderful rapidity by the apostles and primitive fathers, suffered an almost total eclipse by the conquests of the Saracens, and afterwards of the Turks. Incredible indeed have been the hazards, perils, and sufferings of popish missionaries, to propagate their doctrines in the most distant regions, and among the grossest idolaters; but their labours have hitherto failed of success, owing in a great measure to their own avarice, and the avarice and profligacy of the Europeans, who resort thither in search of wealth and dominion.

4.) **ASIA, ISLANDS OF.** The Asiatic islands are very numerous, insomuch that some reckon 10000; but of this there is no certainty. How they may be divided into those of the E. W. S. or S. E. Those that lie on the E. of Asia are, the islands of Jesso or Yedso, and Japan, with several small ones on the coast of Korea, the island of Formosa, and the Philippines. Those on the W. are, the island of Cyprus, in the Mediterranean; Anderoon, off Natolia, and the isle of Rhodes, Rhodio, on the same coast. Those on the E. are, the isles of the Maldives, in the Indian Sea; the isle of Ceylon, off cape Komorin; with a great many small ones in the gulph of Bengal. Those to the S. E. are, the isles of Sandi, as Sumatra, the isles of Java, Borneo, &c. the Moluccas, the isles of Kumbava, Timor, &c.

5.) **ASIA, RIVERS, LAKES, &c. OF.** The chief rivers of Asia are, the Euphrates and Tigris, in Assyria; the Indus and Ganges, in India; the Kiang-ho, in China; the Sir Amu and Wolga, in Western Tartary; the Saghalia Ula or Amur, in Eastern Tartary; the Irtysh, Oby, Jenisea, and

Lena in Siberia. The lake are, that prodigious one called the *Caspian Sea*; and near that another very large one, but lately known to us, called *Aral*, or the lake of eagles. The Baykal is in Siberia, the Kokonor near Tibet, and the Tong Ping in China. The chief mountains are, the Taurus in Turkey and Persia; the Imaus, between India and Tibet; and the Altay, in Tartary.

(6.) **ASIA, SOIL, PRODUCE, &c. OF.** As Asia exceeds the other two parts of our continent, Europe and Africa, so it is superior to them in the serenity of its air, the fertility of its soil, the deliciousness of its fruits, the fragrant and balsamic qualities of its plants, spices, and gums; the salubrity of its drugs; the quantity, variety, beauty, and value of its gems; the richness of its metals, and the fineness of its silks and cottons. A great change indeed hath happened in that part of it called Turkey, which hath lost much of its ancient splendor, and from the most populous and best cultivated spot it Asia, is become a wild and uncultivated desert. The other parts of Asia continue much in their former condition; the soil being as remarkable for its fertility, as most of the inhabitants for their indolence, effeminacy, and luxury. This effeminacy is chiefly owing to the warmth of the climate, though in some measure heightened by custom and education; and the symptoms of it are more or less visible as the several nations are seated nearer or farther from the north. Hence the Tartars, who live near the same latitudes with us, are as brave, hardy, strong, and vigorous, as any European nation. What is wanting in the robust frame of their bodies among the Chinese, Mogul-Indians, and all the inhabitants of the more southern regions, is in a great measure made up to them by the vivacity of their minds, and ingenuity in various kinds of workmanship, which our most skilful mechanics have in vain endeavoured to imitate.

(II.) **ASIA MINOR, OR LESSER ASIA;** the same with Natolia. See **NATOLIA**.

ASIARCHÆ were the Pagan Pontiffs of Asia, chosen to superintend the public games; which they did at their own expence; and therefore they were always chosen from among the richest and most considerable men of the towns. They are mentioned by St Paul, Acts xix. 31, where they are stiled the chiefs of Asia.

ASIATIC, *adj.* any thing produced in Asia.

ASIATICS, the natives of Asia. See § 3. & 6.

(1.) * **ASIDE**, *adv.* [from *a* and *side*.] 1. To one side; out of the perpendicular direction.—

The storm rush'd in, and Arcite stood aghast;
The flames were blown *aside*, yet shone they bright,

Fann'd by the wind, and gave a ruffled light.

Dryden.

2. To another part; out of the true direction.—He had no brother; which though it be a comfortable thing for kings to have, yet it draweth the subjects eyes a little *aside*. *Bacon*. 3. From the company; as, to speak *aside*.—He took him *aside* from the multitude. *Mark* vii. 33.

(2.) **ASIDE**, in the drama, something said by an actor, which some, or even all the other actors present, are supposed not to hear; a circumstance justly condemned as unnatural and improbable.

ASICTOS.

ASICTOS. See **ABSINTHUS**.

ASIITO, a town of Italy, in Perugia, and in the Pope's territories. Long. 23. 40. E. Lat. 43. 0. N.

(1.) **ASILUS**, in entomology, the hornet fly, a genus of insects belonging to the order of insecta diptera. It has two wings; and a horny, straight, two-valved beak. There are 17 species of this insect. Many of them wound in a very painful manner, and are particularly troublesome to cattle in low meadows; others of them are quite harmless. See Plate XIII. fig. 15.

(2.) **ASILUS**, in ornithology, the name used by many for the **LUTEOLA**, or *regulus luteolus*, an extremely small bird, common among willows.

ASINARA, an island on the N. W. coast of Sardinia. Long. 8. 30. E. Lat. 41. 0. N.

ASINARI, an appellation given, by way of reproach, to the ancient Christians, as well as Jews, from a mistaken opinion, among heathens, that they worshipped an ass. The appellation was originally given to the Jews, and only became applied to the Christians: the Jews were charged with keeping a golden ass's head in the sanctuary of the temple, to which, on certain occasions, they paid adoration; in memory of a herd of asses, which in their passing through the wilderness, shewed Moses the way, under a distressing want of water, to a spring.

* **ASINARY**. *adj.* [*asinarius*, Lat.] Belonging to an ass. *DiEt.*

ASINDUM, a town of Andalusia.

ASINESIA, in medicine, an immoveableness of the body, or in any part of it, as in apoplexy, palsy, &c.

* **ASININE**. *adj.* [from *asinus*.] Belonging to an ass.—You shall have more ado to drive our dullest youth, our stocks and stubs from such nurture, than we have now to hale our choicest and hopefulest wits to that *asinine* feast of sow thistles and brambles. *Milton.*

ASINIUS LAPIS, a name given by some writers of the middle ages, to a stone, said to be found in those places frequented by the wild ass. See **BEZOAR**.

ASINIUS POLLIO. See **POLLIO**.

ASINUS, [Lat. an ass,] a species of equus. See **EQUUS**.

ASINUS PISCIS, in ichthyology, a name given by some authors to the *aglesmus*, or common haddock, called also *onos*.

ASIO, in ornithology, a name given by Aldrovandus, and others, to the *otus*, or lesser horn owl.

ASIONGABER. See **ESIÖNGABER**.

ASISIA, or **ASSISIA**, a town of Liburnia, now in ruins, but exhibiting many monuments of antiquity. It is the *Afferia* or *Affesia* of Pliny, and is now called **PODGRAJE**. See **ASSERIA**.

ASISIO, or } a city of the Pope's territories in
ASITIO, } Italy, situated about 16 miles E. of Perugia, and 80 N. of Rome. It is seated on a mountain, and is said to have been the birth place of St Francis. Long. 13. 35. E. Lat. 43. 10. N.

(1.) * **ASK**, **ASH**, **AS**, do all come from the Saxon *æsc*, an ash tree. *Gibson's Camden.*

(2.) **ASK**, a village near Richmond, Yorkshire.

(1.) * **To ASK**. *v. a.* [*ascian*, Saxon.] 1. To petition; to beg: sometimes with an *accusative* y; sometimes with *for*.—

When thou dost *ask* me *bleffing*, I'll kneed down,

And *ask* of thee *forgiveness*. *Shakespeare.*

We have nothing else to *ask*, but this Which you deny already: yet will *ask*, That, if we fail in our request, the blame May hang upon your hardnets. *Shakespeare.*

—In long journeys, *ask* your master *leave* to be able to the horses. *Swift.* 2. To demand; to demand, as, to *ask* a price for goods.—*Ask* me never a much dowry and gift, and I will give according as ye shall say unto me: but give me the *dowry* to wife. *Genesis*, xxxiv. 12.—

He saw his friends, who, whelm'd beneath the waves,

Their funeral honours claim'd, and *ask'd* their quiet graves. *Dryden's Lull.*

3. To question.—O inhabitant of Aroer, stand by the way and espy, *ask* him that flieth, and her that escapeth, and say, what is done? *Jeremiah*, xlii. 19. 4. To enquire; with *after* before the thing.—He said, wherefore is it that thou dost *ask* after my name? And he blessed him there. *Genesis*, xxxii. 29. 5. To require, as physically necessary.—As it is a great point of art, when our matter requires it, to enlarge and veer out all sail; so to take it in and contract it, is no less praise when the argument doth *ask* it. *Ben Jonson.*—A lump of ore in the bottom of a mine will be stirred by two men's strength; which, if you bring it to the top of the earth, will *ask* six men to stir it. *Locke.*—The administration passes into different hands at the end of two months, which contributes to dispatch: but any exigence of state *asks* a much longer time to conduct any design to its maturity. *Addison.*

(2.) * **To ASK**. *v. n.* 1. To petition; to beg: with *for* before the thing.—My son, hast thou *ask'd*? do so no more, but *ask* pardon *for* thy former sins. *Ecclesi.* xxi. 1.—If he *ask* *for* bread, will he give him a stone? *Matt.* vii. 9. 2. To make enquiry; with *for* or *of* before the thing. To enquire.—Stand ye in the ways, and see, and *ask* *for* the old paths, where is the good way, and walk therein, and ye shall find rest for your souls. *Jerem.* vi. 16.—For *ask* now *of* the days that are past, which were before thee, since the day that God created man upon the earth, and *ask* from the one side of heaven unto the other, whether there hath been any such thing as this great thing is, or hath been heard like it. *Deut.* iv. 32.

* **ASKANCE**. } *adv.* Sideways; obliquely.

* **ASKAUNCE**. } —Zelmane, keeping a countenance *askance*, as she understood him not, told him, it became her evil. *Sidney.*—

His wannish eyes upon them bent *askance*,
And when he saw their labours well succeed,
He wept for rage, and threaten'd dire mischance. *Farfax.*

Some say, he bid his angels turn *askance*
The poles of earth, twice ten degrees, and more,
From the sun's axle; they with labour pull'd
Oblique the centrick globe. *Milton.*

* **ASKAUNT**. *adv.* Obliquely; on one side.—
At this Achilles roll'd his furious eyes,
Fix'd on the king *askaunt*; and thus replies,
O, impudent. *Dryden.*

Since the space, that lies on either side
The

The solar orb, is without limits wide,
Grant that the sun had happen'd to prefer
A seat *askant*, but one diameter :
Lost to the light by that unhappy place,
This globe had lain a frozen loansome mass.

Blackmore.

ASKEATON, a town of Ireland, in Limerick
county, which sends two members to parliament.
ASKELON. See ASCALON.

(1.) * ASKER. *n. s.* [from *ask*.] 1. Petitioner.—

Have you,

Ere now denied the *asker*? and, now again
On him that did not ask, but mock, bestow.

Shakespeare.

The greatness of the *asker*, and the smallness of
the thing asked, had been sufficient to enforce his
quest. *South.* 2. Enquirer.—Every *asker* being
satisfied, we may conclude, that all their concep-
tions of being in a place are the same. *Digby of
Ladies.*

(2.) * ASKER. *n. s.* A water newt.

ASKERON, a place 5 miles from Doncaster,
famous for a medicinal spring. It is a strong sul-
phureous water, and is slightly impregnated with
purging salt. It is recommended internally and
externally in strumous and other ulcers, scabs, le-
ucy and similar complaints. It is good in chro-
nic obstructions, and in cases of worms and foul-
ness of the bowels.

ASKERSWELL, a village E. of Bridport.

ASKERSUND, a sea port of Sweden.

ASKERTON CASTLE, a small town in Cum-
berland, near the Piets Wall.

ASKET, a village in Middlesex, near Pinner.

(1.) * ASKEW. *adv.* [from *a* and *skew*.] Aside ;
with contempt.—

For when ye mildly look with lovely hue,

Then is my soul with life and love inspir'd :

But when ye lowe, or look on me *askew*,

Then do I die.

Spenser.

Then take it, Sir, as it was writ,

Nor look *askew* at what it saith ;

There's no petition in it.—

Prior.

(2.) ASKEW, a village near Bedal, Yorkshire.

ASKEYTON, a small town of Ireland, 16 miles
S. of Limerick.

ASKHAM, two villages ; 1. in Nottingham-
shire, N. of Markhams : 2. in Westmoreland near
Ratcliffe.

ASKHAM-BRYAN, and } two villages in the W.

ASKHAM RICHARDS, } Riding of Yorkshire.

ASKRIG, a town in the N. riding of York-
shire, 6 miles S. by E. of York, and 243 N. of
London. Long. 1. 0. W. Lat. 53. 55. N.

ASLABY, two villages in Yorkshire, N. Rid-
ing : viz. 1. near the Esk, S. of Mulgrave Castle ;
2. near Pickering

ASLACKBY, or ASLEBY, a small town in Lin-
colnshire, 2 miles S. of Folkingham.

ASLACKTON, a village in Norfolkshire, near
Hwell-Thorp.

* To ASLAKE. *v. a.* [from *a* and *slake*, or *slack*.]
To remit ; to mitigate ; to slacken. Obsolete.—

But this continual, cruel, civil war,

Nor skill can stint, nor reason can *aslake*. *Spens.*

Whilst seeking to *aslake* thy raging fire,

Thou in me kindlest much more great desire.

Spenser.

ASLAN, or } in commerce, a name given to
ASLANI, } the Dutch dollar, in most parts
of the Levant. The word is also written corrup-
tly, ASSELANI. It is originally Turkish, and sig-
nifies a lion, which is the figure stamped on it.
The Arabs, taking the figure of a lion for a dog,
called it *abu/keib*. It is silver but much alloyed,
and is current for 115 or 120 aspers. See ASPER.

* ASLANT. *adv.* [from *a* and *slant*.] Obli-
quely ; on one side ; not perpendicularly.—

There is a willow grows *aslant* a brook,

That shews his hoar leaves in the glassy stream.

Shakespeare's Hamlet.

He fell ; the shaft

Drove through his neck *aslant* ; he spurns the
ground,

And the soul issues through the weazon's wound.

Dryden.

ASLEBY. See ASLACKBY.

* ASLEEP. *adv.* [from *a* and *sleep*.] 1. Sleep-
ing ; at rest.—

How many thousands of my poorest subjects
Are at this hour *asleep* ! O gentle sleep,

Nature's soft nurse, how have I frighted thee !

Shakespeare.

The diligence of trade, and noiseful gain,

And luxury more late *asleep* were laid :

All was the night's, and, in her silent reign,

No found the rest of nature did invade. *Dryden.*

—There is no difference between a person *asleep*,
and in an apoplexy, but that the one can be a-
waked, and the other cannot. *Arbutnot on Diet.*

2. To sleep.—If a man watch too long, it is odds
but he will fall *asleep*. *Bacon's Essays.*—

Thus done the tales, to bed they creep,

By whispering winds soon full'd *asleep*. *Milton.*

* ASLOPE. *adv.* [from *a* and *slope*.] With de-
clivity ; obliquely ; not perpendicularly.—Set them
not upright, but *aslope*, a reasonable depth under
the ground. *Bacon.*—

The curse *aslope*

Glanc'd on the ground ; with labour I must earn

My bread : what harm ? Idleness had been
worse :

My labour will sustain me.

Milton.

The knight did stoop,

And sat on further side *aslope*.

Hudibras.

ASMATOGRAPHER, [from *asma*, a song, and
graphein, to write,] a composer of songs.

ASMER, a province of India, on this side the
Ganges, between the Indus and Delhi.

ASMILD, or } a village of N. Jutland, cele-

ASMIND, } brated for an ancient convent
in it.

ASMODAI, the name given by the Jews to the
prince of demons ; and, according to R. Elias,
the same with *Sammach*.

ASMONEUS, or ASSAMONEUS, the father of
Simon, and chief of the Asmoneans, a family
that reigned over the Jews 126 years.

ASNA, or FSNA, a town in Upper Egypt, scat-
ed upon the Nile, believed by some authors to be
the ancient Syena, though others say the ruins of
it are still to be seen near Assuan. It is so near
the cataracts of the Nile, that they may be heard
from thence. It contains several monuments of
antiquity ; and among the rest an ancient Egypti-
an temple, pretty entire, all painted throughout,

h h h h

except

except in some places that are effaced by time. The columns are built in hieroglyphic figures. This figure of a house made use of for a stable, wherein they put oxen, camels, and goats. A little way from thence are the ruins of an ancient nursery, said to be built by St Helena, surrounded with tombs.—Afnas is the principal town in these parts, and the inhabitants are rich in corn and cattle. They drive a considerable trade into Lower Egypt and Nubia, by means of the Nile, and also by the caravans that pass over the Desert. The inhabitants are all of the same race, the Egyptians, and the ancient inhabitants, who are Christians. They are under the government of the Turks, who have a cadî, and the Arabs have two chiefs of their own nation. Long. 110. 40. E. Lat. S. 11. or as others have it. 12. 45. N

ESNAPPER, an Assyrian prince, mentioned in EZRA, iv. 10. who settled the original Samaritans in the country of the ten tribes. It is uncertain, whether he was Salmancet or Esarhaddon, or one of their generals.

ASOLA, a town of Brescia in Italy, belonging to the republic of Venice, 10 miles S. E. of Brescia, and 21 N. W. of Mantua. Long. 14. 38. E. Lat. 45. 35. N.

ASOLO, a town of Italy, in Trevisan, seated on a mountain 17 miles N. W. of Trevisan, and 32 N. E. of Bassano. Long 12. 2. E. Lat. 45 49 N.

* **ASOMATOUS**, *adj.* (from *a-* priv. and *soma*, body) Incorporated, or without a body.

(1) ASOPH, a district of the Russian empire bordering on the sea of Asoph (see No. 2). It was wholly ceded to Catherine II, by the Grand Signior, in 1774, since which time several towns have been built in it, one of which is called CATHERINESLAVE, i. e. *Catherine's Glory*; and is now the capital.

(2.) **ASORH**, a town of Cohan Tartary, in Asia, seated on the river Don, near its mouth, little to the E. of the Palus Marotis, or Sea of Asaph. It has often been taken and retaken. In 1739, and 1774, it was ceded to Russia by the Turks. Long. 44. 30. E. Lat. 47. 18. N.

(3) AZOFF, or ZAZAK, anciently called PALUS MOSCOTIA, a sea between Europe and Asia, about 600 miles in circumference. It lies N. of the Black Sea, with which it communicates by the Strait of Caffa, the ancient Cimmerian Bosphorus.

(4.) **ASOPK**, the name of a village of the United States, which was burnt during the American war, and the whole defenceless inhabitants, men, women and children, barbarously massacred to the number of about 5000, so the night time General Washington retaliated, the first fort afterwards took, by giving no quarter till he had cut off an equal number of British troops!

— *Plus vite, s'il te plaît.*

Temperit a latryma, 9

ASOPIDES. See ASOPUS, N° 1.
ASOPID. See ASOPUS, N° 2.

ASOPUS, a town of Lacedaemon.

(1) *Λακωνικός*, a town of Laconia, in the *Peninsula* of Laconia, with a port in a peninsula, between the E. and the mouth of the Eurotas to the W. The citadel only remains hardly now called, by the failure, *Castell Komana*.

(3.) *Asopus*, in ancient geography, the name

of several rivers, viz. 1. in Boreto, which runs from mount Cithæron, and watering the territory of Thebes, separates it from the territory of Plata, and falls with an east course into the Eurymachus at Tanagra. On this river Adrastus king of Sicyon built a temple to Nemesis, and from it Thebes came to be surnamed Asporis. It is now called Asoro, 2. in Peloponnesus, which runs into Sicyon, and with a N. W. course falls into the Sinus Corinthiacus, W. of Corinth. 3. in Phrygia runs, which with the Lycus waters Lacedæmon. On the borders of Thebæis, rising in Mount Othys and falling into the Sinus Mælyæis.

ASOR, or } in ancient geography, 1. a town in the S. of Judah, near Hebron, called also Hazor, and Hazor-Hadatta, transferred to the seventy *Septuaginta*. 2. a town of Galilee, the capital of all the kingdoms N. of Palestine, was taken by Joshua, & the inhabitants were put to the sword, and their houses burnt. It was afterwards rebuilt, but remained till the time of the Crusades, though in the time of Napoleon it lay N. of the Lacus Sarabonensis, called Scripture the *Magers of Merom*.

ASOTIA, intemperance, prodigality
ASOTUS, wastefulness, extravagance of life

ASOW, a celebrated fortress of Russia, a place of considerable trade, but now demolished. It was situated in the district of Bashkiria.

It was located in the district of Bactria, the place where the Greeks many centuries ago built the city of 'Tamas', which was very famous for its trade, and underwent many vicissitudes. The Gensoe, who settled a trade with the Chinese, soon after the discovery of Archangel by C. Chancellor, became masters of this place.

gave it the name of *Tana*, or *Catana* by the Tartars, who were very powerful in their time to have been in possession of it long before.

for, as Buching informs us, there are African
yet extant, on which is the name of *Tak*
Kas. From the Genoeffe it fell into the hands
the Turks, lost its trade, and became an im-
derable town. In 1637, it was taken by the
facks, who defended it against the Turks.

and next year set fire to it, and blew it up. The Turks rebuilt it with strong fortifications. The Russians laid claim to it in 1673, and took it in 1696; but, by the treaty of Pruth in 1711, it was restored to the Turks. In 1736, the Russians came masters of Afow, but by the treaty of 1740, they were obliged to relinquish and destroy it.

(1). * ASP. ASPICER. *a. f.* (*aspis*, Lat., of serpent, whose poison kills without a p of applying any remedy.—It is sent to small, and peculiar to Egypt and Lydia, that are bitten by it, die within three bo the manner of their dying being by sleep any pain, Cleopatra chose it. *Calamari*—

High-minded Cleopatra, that with
Of *asp's* sting, herself did kill, *For*
Scorpion, and *asp*, and amphisbaena
And dissa-

(5.) AEP is said to be thus denominated the Greek *men, shield*, on account of being convolved in a circle, in the centre of which head, which it encloses, is placed the

me or umbilicus of a buckle. This (most

ry frequently mentioned by authors; but so easily described, that it is not easy to determine which, if any of the species known at present may properly be called by this name. It is to be common in Africa, and about the banks of the Nile; and Bellonius mentions a small species which he had met with in Italy, and which is a sort of callous excrescence on the forehead, which he takes to have been the aspis of the ancients. It is with the asp that Cleopatra is said to have dispatched herself, and prevented the designs of Augustus, who intended to have carried her captive to adorn his triumphal entry into Rome. But this fact is contested: Brown places it among the errors. The indications of that queen's having used the ministry of the asp, were only two most insensible pricks found in her arm; and Archæus says it is unknown what she died of. At the same time, it must be observed, that the slightness of the pricks found in her arm furnishes no presumption against the fact; for no more than a prick of a needle-point dipped in the poison was necessary for the purpose. See the article SNAKE. Lord Bacon says, the asp is the least painful of all the instruments of death. He supposes it to have an affinity to opium, but to be less disagreeable in its operation; and his opinion seems to correspond with the accounts of most writers, as well as with the effects described to have been produced upon Cleopatra. The ancients had a plaster called *Aspidion*, made of this terrible animal, of great efficacy as a discutient of strumæ and other indurations, and used likewise against the stone of the gout. The flesh and skin, or excrement of the creature, had also their share in the ancient materia medica.

1.) * *ASP.* *n. f.* A tree. See ASPEN.
 ASPA, a town of Parthia, now called ISPAHAN. Ptolemy the latitude seems to agree, being 33°; whether the longitude does, is a question. Long. 51. 0. E. Lat. 32. 30.

1.) * *ASPALATHUS.* *n. f.* [Latin.] 1. A plant which bore the rose of Jerusalem, or our lady's rose. The wood of a prickly tree, heavy, oleaginous, somewhat sharp and bitter to the taste.—*Aspalathus* affords an oil of admirable scent, reputed one of the best perfumes. *Chambers.*—It has a sweet smell like cinnamon and *aspalathus*, and yielded a pleasant odour like the best myrrour. *Plin.* xxiv.

(2.) *ASPALATHUS*, AFRICAN BROOM: A genus of the decandria order, belonging to the dialypetalia class of plants: and in the natural method ranking under the 32d order, Papilionaceæ. The calyx consists of 5 divisions: the pod is oval, and contains 2 seeds. Of this genus there are 19 species; all of which are natives of warm climates, and must be preserved in stoves by those who would cultivate them here. The rose wood, whence the oleum Rhodii is obtained, is one of the species, but of which we have yet had no particular description.

(3.) *ASPALATHUS*, in pharmacy, is also called *ignum Rhodium*, or rose wood; and by some, Cyprus wood: the former on account of its sweet smell, or growth in the island of Rhodes; the latter from its being also found in the island of Cyprus. It was anciently in much repute, as an

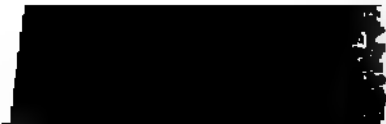
astringent and strengthener; but is now little used internally. In virtue, taste, smell, and weight, it resembles the *lignum aloes*; and in physic they are frequently substituted for each other. *Aspalathus* is chiefly used in scenting pomatums, and liniments. See § 1, and 2.

ASPALE, a village near Debenham, Suffolk.

(1.) * *ASPARAGUS.* *n. f.* [Lat.] The name of a plant. It has a rosaceous flower of six leaves, placed orbicularly, out of whose centre rises the pointal, which turns to a soft globular berry, full of hard seeds. *Miller.*—*Asparagus* affects the urine with a fetid smell, especially if cut when they are white; and therefore have been suspected by some physicians, as not friendly to the kidneys; when they are older, and begin to ramify, they lose this quality; but then they are not so agreeable. *Arb.*

(2.) *ASPARAGUS*, SPARAGUS, SPERAGE, or SPARROWGRASS: A genus of the monogynia order, belonging to the hexandria class of plants, and in the natural method, ranking under the 11th order, Samentaceæ. The calyx is quinquepartite, and erect; the 3 inferior petals are bent outwards; the berry has 3 cells, and contains two seeds. There are 10 species; but the only one cultivated in the gardens is the common asparagus, with an upright herbaceous stalk, bristly leaves, and equal stipula. The other species are kept only in the gardens of the curious, for the sake of variety.

(3.) *ASPARAGUS*, CULTURE OF THE. The garden asparagus is with great care cultivated for the use of the table. The propagation of this useful plant is from seed; and as much of the success depends upon the goodness of the seed, it is much better to save it than to buy it at the shops. The manner of saving it is this: Mark with a stick some of the fairest buds; and when they are run to berry, and the stalks begin to dry, and wither, cut them up; rub off the berries into a tub, and pouring water upon them, rub them about with your hands; the husks will break and let out the seed, and will swim away with the water, in pouring it off; so that in repeating this two or three times, the seeds will be clean washed, and found at the bottom of the tub. These must be spread on a mat to dry, and in the beginning of February, must be sown on a bed of rich earth. They must not be sown too thick, and must be trod into the ground, and the earth raked over them smooth: the bed is to be kept clear of weeds all the summer; and in October, when the stalks are withered and dry, a little rotten dung must be spread half an inch thick over the whole surface of the bed. Next spring, the plants will be fit to plant out; the ground must therefore be prepared for them by trenching it well, and burying a large quantity of rotten dung in the trenches, so that it may lie at least 6 inches below the surface of the ground: when this is done, level the whole plot exactly, taking out all the loose stones. This is to be done just at the time when the asparagus is to be planted out; which must be in the beginning of March, if the soil is dry, and the season forward; but in a wet soil, it is better to wait till the beginning of April, which is about the season that the plants are beginning to shoot. The season being now come,



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my judgment, the image or picture of a great
n, and have the true *aspect* of a world lying in
birth. *Burnet's Theory.* 2. Countenance; look.

Those eyes of thine from mine have drawn
salt tears,

Sham'd their *aspects* with store of childish drops.

Shakespeare's Richard III.

I am fearful: wherefore frowns he thus?

'Tis his *aspect* of terrour. All's not well.

Shakespeare.

Yet had his *aspect* nothing of severe,
But such a face as promis'd him sincere. *Dryden.*

Then shall thy Craggs (and let me call him
mine)

On the east ore another Pollio shine;
With *aspect* open shall erect his head. *Pope.*

Giance; view; act of beholding.—

Fairer than fairest, in his faining eye,
Whole sole *aspect* he counts felicity. *Spencer.*

When an envious or an amorous *aspect* doth infect
spirits of another, there is joined both affec-

tion and imagination. *Bacon's Natural History.* 4.

fection towards any point; view; position.—

The setting sun
Slowly descended; and with right *aspect*

Against the eastern gate of paradise,
Level'd his evening rays. *Paradise Lost.*

have built a strong wall, faced to the south *aspect*
th brick. *Swift.* 5. Disposition of any thing to

nothing else; relation.—The light got from the
posite arguings of men of parts, shewing the

ferent sides of things, and their various *aspects*
of probabilities, would be quite lost, if every

one were obliged to say after the speaker. *Locke.*

Disposition of a planet to other planets.—

There's some ill planet reigns,

I must be patient till the heavens look

With an *aspect* more favourable.

Shakespeare's Winter's Tale.

astonishing that which astrologers call a conjunction
planets, of no very benign *aspect* the one to the

other position.

To the blank moon

Her office they prescrib'd; to th' other five

Their planetary motions, and *aspects*,

In sextile, square, and trine, and opposite.

Paradise Lost.

Why does not every single star shade a separate
fluence, and have *aspects* with other stars of their

own constellation? *Bentley's Sermons*

(1.) *ASPECT*, in astronomy, denotes the situa-

tion of the planets and stars with respect to each

other. There are 5 different aspects. 1. Sextile

aspect is when the planets or stars are 60° distant,

marked thus *. 2. The quartile, or quadrante,

when they are 90° distant, marked □. 3. Trine,

when 120° distant, marked Δ. 4. Opposition, when

180° distant, marked °. And, 5. Conjunction,

when in the same degree, marked ∅. Kepler,

who added 8 new ones, defines aspect to be the

angle formed by the rays of two stars meeting on

the earth, whereby their good or bad influence is

ascertained: for it is to be observed, that these

aspects being first introduced by astrologers, were

distinguished into benign, malignant, and indiffer-

ent; the quartile and opposition being accounted

align: the trine and sextile, benign or friendly;

and the conjunction indifferent.

(3.) *ASPECT*, in gardening, signifies exposure.

(4.) *ASPECT*, DOUBLE, is used in painting,
where a single figure is so contrived, as to repre-
sent two or more different objects, either by
changing the eye, or by means of angular glasses.
See ANAMORPHOSIS, CATOPTICS, &c.

* *To ASPECT*. v. a. [*aspicio*, Lat.] To behold;
not used.—

Happy in their mistake, those people whom
The northern pole *aspects*; whom fear of death
(The greatest of all human fears) ne'er moves.

Temple.

* *ASPECTABLE*. adj. [*aspectabilis*, Lat.] Vi-
sible; being the object of sight.—He was the sole
cause of this *aspectable* and perceivable universal.
Raleigh.—To this use of informing us what is in
this *aspectable* world, we shall find the eye well
fitted. *Ray on the Creation.*

* *ASPECTION*. n. f. [from *aspect*.] Beholding;
view.—A Moorish queen, upon *aspection* of the
picture of Andromeda, conceived and brought
forth of a fair one. *Brook.*

(1.) * *ASPEN*. adj. [from *asp* or *aspen*.] 1. Be-
longing to the asp tree.—

Oh! had the monster seen those lily hands
Tremble like *aspen* leaves upon a lute. *Shakespeare.*

No gale disturbs the trees,

Nor *aspen* leaves confess the gentlest breeze.

Gay.

2. Made of aspen wood.

(2.) * *ASPEN*, or *ASP*. n. f. [*aspe*, Dutch; *asp*, Dan.
aspe, trembling, Sax. *Sommer*.] See *POPLAR*, of
which it is a species. The leaves of this tree al-
ways tremble.—The *aspen* or *asp* tree hath leaves
much the same with the poplar, only much small-
er, and not so white. *Mortimer* —

The builder oak sole king of forests all,
The *aspen*, good for statues, the cypress funeral.

Spenser.

(3.) *ASPEN TREE*, in botany. See *POPULUS*.

ASPENDEN, a village in Hertfordshire, near
Buntingford.

(1.) * *ASPER*. adj. [Lat.] Rough; rugged. This
word I have found only in the following passage.
—All base notes, or very treble notes, give an
asper sound; for that the base stricketh more air
than it can well strike equally. *Bacon.*

(2.) *ASPER*, in commerce, or *ASPRE*, a little Tur-
kish silver coin, wherein most of the grand signior's
revenues are paid. The *asper* is worth something
more than an English halfpenny. The only im-
pression it bears, is that of the prince's name under
whom it was struck. The pay of the janizaries
is from 2 to 12 *aspers per diem*.

(3.) *ASPER*, in grammar, an accent peculiar to
the Greek language, marked thus (´); and import-
ing, that the letters over which it is placed ought
to be strongly aspirated, or pronounced as if an *h*
were prefixed.

(4.) *ASPER*, in ichthyology, a small fish caught
in the Rhone, so called from the roughness of its
scales. Its head is large, in proportion to its bo-
dy, and of a pointed shape. It has no teeth, but
its jaws are sharp to the touch. It is of a dark
red colour, with large black spots. It is good to
eat, and is esteemed aperitive.

ASPERA ARTERIA, in anatomy, the windpipe
or trachea. See *ANATOMY*, § 354—358.

* *To*

* **TO ASPERATE.** *v. a.* [*aspero*, Lat.] To roughen; to make rough or uneven.—Those corpuscles of colour, insinuating themselves into all the pores of the body to be dyed, may *asperate* its superficies, according to the bigness and texture of the corpuscles. *Boyle.*

* **ASPERATION.** *n. s.* [from *asperate*.] A making rough. *Dict.*

ASPERGELLOUS, in botany, the name given by Micheli to that genus of mosses, called by Dillenius, and others, byssus.

ASPERGILE, or } in antiquity, a long brush
ASPERGILLUM, } made of horse hair fixed to a handle, wherewith the lustral water was sprinkled on the people in lustrations and purifications. The ancients, instead of a brush, made use of branches of laurel and olive. It is also applied to the instrument in Romish churches, wherewith holy water is sprinkled.

ASPERGULA. See **ASPERULA.**

ASPERIFOLIÆ PLANTÆ, rough-leaved plants. The name of a class in Hermannus, Boerhaave, and Ray's methods, consisting of plants which have naked seeds, and whose leaves are rough to the touch. In Tournefort's System, these plants constitute the third section or order of the 2d class; and in Linnæus's Sexual Method, they make a part of the pentandria monogynia.

ASPERIFOLIATE, or **ASPERIFOLIOUS**, among botanists, such plants as are rough-leaved, having their leaves placed alternately on their stalks, and a monopetalous flower divided into five parts. They constitute the 49th order of plants in the *Fragmenta Methodi Naturalis* of Linnæus, in which are these genera, *tournefortia*, *cerinthe*, *symphytum*, *pulmonaria*, *anchusa*, *lithospermum*, *myosotis*, *heliotropium*, *cynoglossum*, *asperugo*, *lycopsis*, *echium*, *borrago*: *magis minusve oleraceæ, mucilaginosæ, & glutinosæ sunt.*

* **ASPERIFOLIOUS.** *adj.* [from *asper*, rough, and *folium*, a leaf, Lat.] One of the divisions of plants, so called from the roughness of their leaves.

(1.) * **ASPERITY.** *n. s.* [*asperitas*, Lat.] 1. Unevenness; roughness of surface.—Sometimes the pores and *asperities* of dry bodies are so incommensurate to the particles of the liquor, that they glide over the surface. *Boyle.* 2. Roughness of sound; harshness of pronunciation. 3. Roughness, or ruggedness of temper; moroseness; sourness; crabbedness.—The charity of one, like kindly exhalations, will descend in showers of blessings; but the rigour and *asperity* of the other, in a severe doom upon ourselves. *Govern. Tongue.*—Avoid all unseemliness and *asperity* of carriage; do nothing that may argue a peevish or forward spirit. *Rogers.*

(2.) **ASPERITY**, the inequality of the surface of any body, which hinders the hand from passing over it freely. From the testimony of some blind persons, it has been supposed that every colour hath its particular degree of asperity; though this has been denied by others. See the article **BLIND.**

ASPERJULA. The same with **ASPERULA.**

ASPERLEY, a village in Lincolnshire, near Sleaford.

* **ASPERNATION.** *n. s.* [*aspernatio*, Lat.] Neglect; disregard. *D.*

ASPEROSA, a town of Turkey, in Europe; it

is a bishop's see, situated on the coast of the Archipelago. Long 25. 20. E. Lat. 40. 58. N.

* **ASPEROUS.** *adj.* [*asper*, Lat.] Rough; uneven.—Black and white are the most *asperous* and unequal of colours; so like, that it is hard to distinguish them: black is the most rough. *Boyle.*

* **TO ASPERSE.** *v. a.* [*aspergo*, Lat.] To bespatter with censure or calumny.—In the business of Ireland, besides the opportunity to *asperse* the king, they were safe enough. *Clarendon.*

Curb that impetuous tongue, nor rashly say,

And singly mad, *asperse* the sov'reign reign. *Id.*

Unjustly poets we *asperse*,

Truth shines the brighter clad in verse. *Id.*

ASPERSHELES, a village of Northumberland, on the borders of Scotland.

* **ASPERSION.** *n. s.* [*aspersio*, Lat.] 1. A sprinkling.—

If thou dost break her virgin knot, before

All sanctimonious ceremonies,

No sweet *aspersions* shall the heav'ns let fall,

To make this contract grow. *Shakspeare.*

It exhibits a mixture of new conceits and old, whereas the instauration gives the new unmixt, otherwise than with some little *aspersions* of the old for taste's sake. *Bacon.* 2. Calumny; censure.—The same *aspersions* of the king, and the laid grounds of a rebellion. *Dryden.*

ASPERTON, a village in Hertfordshire, near Stow-Chapel and Soreton.

ASPERUGO, SMALL WILD BUGLOSS, in botany, a genus of the pentandria monogynia class; and in the natural method ranking under the *Asperifolia*. The calyx of the fruit is compressed with folds flatly parallel, and sinuous. There are two species, viz.

1. **ASPERUGO ÆGYPTIACA**, a native of Egypt.

2. **ASPERUGO PROCUMBENS**, or wild bugloss, a native of Britain; which is eaten by horses, sheep, and swine; but cows are not fond of it.

ASPERULA, WOODROOF: A genus of the pentandria monogynia order, belonging to the hexandria class of plants; and in the natural method ranking under the 47th order, *Stellata*. The corolla is tubuliform; and the capsule contains two globular seeds. There are two species; which both grow wild in Britain, and therefore are seldom admitted into gardens: viz.

1. **ASPERULA CYNANCHICA**, found on chalky hills. The roots are used for dyeing red in Sweden.

2. **ASPERULA ODORATA**, a low umbelliferous plant, growing wild in woods and copes, and flowering in May. It has an exceeding pleasant smell, which is improved by moderate exsiccation; the taste is sub saline, and somewhat austere. It imparts its flavour to vinous liquors. *Asperula* is supposed to attenuate viscid humours, and to strengthen the tone of the bowels; it is recommended for obstructions of the liver and biliary ducts, and for some in epilepsies and palsies; modern practice has nevertheless rejected it. The smell of it is said to drive away ticks and other insects.

ASPEYTIA, a town of Spain, in Biscay, known on the Viola, in a fine valley, near the districts of Loyola and Onis. Long. 2. 23. W. Lat. 43. 20. N.

ASPHALATUS, in botany. See **ROBINA.**

ASPHALITES, in anatomy, the fifth vertebra of the loins.

* ASPHALTICK. *adj.* [from *asphaltos*.] Gum-
my; bituminous.—

And with *asphaltick* slime, broad as the gate,
Deep to the roots of hell, the gather'd beach
They fasten'd Milton.

(1.) ASPHALTITES, a lake of Judea, so called from the great quantity of bitumen it produces; called also the *Dead Sea*; and from its situation, the *East Sea*; the *Salt Sea*, the *Sea of Sodom*, the *Sea of the Desert*, and the *Sea of the Plain*, by the sacred writings. It is inclosed on the E. and W. with exceeding high mountains, many of them craggy and dreadful to behold. On the N. it has the plain of Jericho; or, if we take in both sides of the Jordan, it has the Great Plain, properly so called, on the S. which is open, and extends beyond the reach of the eye. Josephus takes this lake 580 furlongs in length, from the mouth of the Jordan to the town of Segor, on the opposite end, that is about 22 leagues; and about 10 furlongs, or 5 leagues, in its largest breadth: but our modern accounts commonly give it 24 leagues in length, and 6 or 7 in breadth. On the E. side of it is a kind of promontory, where they pretend to show the remains of Lot's metamorphosed wife. Josephus says it was still standing in his time; but when Prince Radziville inquired of it, they told him there was no such salt pillar or statue to be found in all that part. However, they have found means, about a century after him, to recover, as they pretended to assure Mr Maundrell, a block or stump of it, which may in time grow up, with a little art, into its ancient shape.

(2.) ASPHALTITES, ANCIENT ACCOUNTS OF. Many things have been said and written of this lake, or, (if indeed true,) rather infamous lake; such as that it arose from the submersion of the city of Siddim, where once stood, as is commonly reported, the three cities which perished in the fabulous conflagration, with Sodom and Gomorrah, for their unnatural and detestable wickedness: on which account this lake has been looked upon as a lasting monument of the just judgment of God, to deter mankind from such abominations. Hence it is added, that the waters of the lake are so impregnated with salt, sulphur, and other bituminous stuff, that nothing will sink or swim in it; and that it casts such stench and smoke, that the very birds die in attempting to fly over it. The description likewise of the apples that grew about it, fair without, and only ashes and bitterness within, were looked upon as a farther monument of God's anger. Many travellers have also described not only the lake, but all the country round about, as appearing dreadful to behold, all phureous, bituminous, stinking, and suffocating: and lastly, it hath been affirmed that the ruins of five cities are still to be seen in clear weather, and have been actually seen in these latter times.

(3.) ASPHALTITES, ANCIENT ACCOUNTS OF, DUBIOUS. All these surprising things, however, though commonly, and long, received among Christians, have been of late much exploded, not only by the testimony of very credible witnesses, but even by arguments drawn from scripture, that must give them up as inventions, unless we will suppose the face and nature of all these things

to have been entirely changed. Those, in particular, of bodies not sinking in the water, and of birds being stifled by the exhalations of it, appear now false in fact. It is true, the quantity of salt, alum and sulphur, with which it is impregnated, render it so much specifically heavier (Dr Pococke says one fifth) than fresh water, that bodies will not so easily sink: yet that author, and others, assure us, they have swam and dived in it; and, as to the birds, we are told likewise, that they will fly over it without any harm. To reconcile these things with the experiments, which, Pliny tells us, had been made by Vespasian, is impossible, without supposing that those ingredients have been since much exhausted, which, indeed, is not at all improbable; such quantities of them, that is, of the bitumen and salt, having been all along, and being still taken off, and such streams of fresh water continually pouring into it, as may reasonably be supposed to have considerably diminished its gravity and denseness. For, with respect to its salt, we are told, the Arabs made quantities of it from that lake, in large pits about the shore, which they fill with that water, and leave to be crystallized by the sun. This salt is in some cases much commended by Galen, as very wholesome, and a strengthener of the stomach, &c. by its unpleasant bitterness. What likewise relates to the constant smoke ascending from the lake, its changing the colour of its water three times a-day, so confidently affirmed by Josephus, and other ancients, and confirmed by Prince Radziville and other moderns, who pretend to have been eye-witnesses of it, is all now in the same manner exploded by others of more modern date, and of at least equal candour.

(4.) ASPHALTITES, MODERN ACCOUNTS OF. The unhealthiness of the air about this lake was affirmed by Josephus and Pliny, especially on the west. The monks that live in the neighbourhood confirm this, and would have dissuaded Dr Pococke from going to it on that account; and, as he ventured to go and bathe in it, and was, two days after, seized with a dizziness, and violent pain in the stomach which lasted near 3 weeks, they made no doubt but it was occasioned by it; and he doth not seem to contradict them. As to the water, it is, though clear, so impregnated with salt, that those who dive into it come out covered with a kind of saline matter. There is one remarkable thing relating to this lake, generally agreed on by all travellers and geographers; viz. that it receives the waters of Jordan, a considerable river, the brooks of Jabbok, Kishon, Arnon, and other springs, which flow into it from the adjacent mountains, and yet never overflows, though there is no visible way to be found by which it discharges that great influx. Some naturalists have been greatly embarrassed to find a discharge for these waters; and have therefore been inclined to suspect the lake had a communication with the Mediterranean. But, besides that we know of no gulph to corroborate this supposition, it has been demonstrated by accurate calculations, that evaporation is more than sufficient to carry off the waters brought by the rivers. It is, in fact, very considerable; and frequently becomes sensible to the eye, by the fogs with which the lake is covered



seen in the compositions of some moderns. Mr Shaw tells us that there informed, that was raised at certain times, and that the large hemispheres, which, as soon as they are the surface, and are acted upon by the air, burst at once, with great noise and with the pulvis fulminans of the chemists, and produce a thousand species. From their own authority, we are told that the late Maundrell's mistake, both as to the fact being it only on certain seasons, that period might be there at the wrong time, and that as to his not observing it about the shores of the Arabs are there ready to gather it as soon as they see it. All of them describe it as resembling our old pit-balls, and that it is not so, it but by its sulphureous smoke and heavy set on fire, and it hath been commonly taken to be the same with that which our dignities under the name of *batouen* Judaea, of pitch, though we have reason to think that it is not, and that there is now one right alphabet brought from Japan, which has been confounded with a form of black considerable stone thrown on the flame, and called some *Mafle's stone*, which, being held in the hand of a candle, goes burns, and casts a considerable smoke; but has this extraordinary property, though it loses much of its weight in colour, becomes brighter from it, and it manifests nothing of its bulk. These, Dr. Shaw tells us, are found about a certain mountain. He concludes, however, from *the* *frustration* of that stone under the like experiment, that the matter that feeds the wood with fire, and causes the lightning to work up of it.

3. **ASPHALTUM.** *n. f.* [asphaltum, increased from *asphal-*, brittle, black, bituminous, increased from *asphal-*, asphaltum, and *-tum*, a substantive suffix.] A black, bituminous, and combustible substance, occurring in nature, and chiefly known to the ancients from its use in swimming on the surface of the *Lacus Asphalensis* or Dead Sea, where anciently used in the construction of the walls of the cities of Sodom and Gomorrah. It is said up to the present time to be used in the preparation of the asphaltum of the bays of the Mediterranean Sea, and being thrown upon the water, is used to destroy the floating weeds, and other fat bodies, and condenses gradually.

(1.) **ASPHALTUM.** *n. f.* [Lat., a substance found near the ancient Babylon, increased from *asphal-*, brittle, black, bituminous, increased from *asphal-*, asphaltum, and *-tum*, a substantive suffix.] A black, bituminous, and combustible substance, occurring in nature, and chiefly known to the ancients from its use in swimming on the surface of the *Lacus Asphalensis* or Dead Sea, where anciently used in the construction of the walls of the cities of Sodom and Gomorrah. It is said up to the present time to be used in the preparation of the asphaltum of the bays of the Mediterranean Sea, and being thrown upon the water, is used to destroy the floating weeds, and other fat bodies, and condenses gradually.

(2.) ASPHALTUM, BITUMEN JUDAICUM, or as PITCH, is a light solid bitumen, of a dusky colour on the outside, and a deep shining black thin; of very little taste; and having scarcely any smell, unless heated, when it emits a strong chy one. It is found in a soft or liquid state on the surface of the Dead Sea, and by age grows hard. The same kind of bitumen is met with likewise in the earth, in China, America, and in some places of Europe, as the Carpathian Mountains, France, &c. There are several kinds of Jews' pitch in the shops: but none of them are genuine. They have little other title indeed to the name, than their being artificially compounded by Jews; as they are a medley of various ingredients, in medicinal use begins to be deservedly laid aside, notwithstanding the discutient, resolvent, stercoral, and other virtues, attributed to this bitumen by the ancients. The true asphaltum was formerly used in embalming the bodies of the dead. The thick and solid asphaltum are at present employed in Egypt, Arabia, and Persia, as pitch for ships; as the fluid ones, for burning in lamps, and for varnishes. Some writers relate, that the walls of Babylon, and the temple of Jerusalem, were cemented with bitumen instead of mortar. This much is certain, that a true natural bitumen, that for instance which is found in the district of Neufchatel, proves an excellent cement for walls, pavements, and other purposes, commonly firm, very durable in the air, and impenetrable by water. The watch and clock makers use a composition of asphaltum, fine lamp-glass, and oil of spike or turpentine, for drawing the black figures on dial-plates: this composition is prepared chiefly by certain persons at Nuremberg.

1.) * ASPHODEL. *n. f.* [*lilio-asphodelus*, Lat.] y-lily.—*Asphodels* were by the ancients planted in burying places, in order to supply the manes of the dead with nourishment.—

By those happy souls who dwell
In yellow meads of *asphodel*.

Pope.

2.) ASPHODELUS, ASPHODEL, or KING'S SPEAR. Genus of the monogynia order, belonging to the hexandria class of plants. The calyx is divided into 6 parts; and the nectarium consists of six lobes covering the nectarium. There are 5 species, viz.

1. ASPHODELUS ALBUS, the white asphodel, hath keel shaped leaves, hath roots composed of small fibres, and knobs at bottom: the leaves are green, almost triangular, and hollow like the keel of a boat; the stalks seldom rise above 2 feet high, and divide into several spreading branches; these are terminated by loose spikes of white flowers.

2. ASPHODELUS LUTEUS, or common yellow asphodel, hath roots composed of many thick fleshy fibres, which are yellow, and joined into a mass at the top; from whence arise strong round stalks near 3 feet high, garnished on the upper part with yellow star-shaped flowers, which appear in June, and the seeds ripen in autumn.

3. ASPHODELUS NONRAMOSUS, or the unbranched asphodel, hath roots like the ramosus, (See 4.) but the leaves are longer and narrower; the stalks are single, never putting out any side

branches. The flowers appear at the same time with the former, are of a purer white, and grow in longer spikes.

4. ASPHODELUS RAMOSUS, or branching asphodel, hath roots composed of fleshy fibres, to each of which is fastened an oblong bulb as large as a small potatoe; the leaves are long and flexible, having sharp edges; between these come out the flower-stalks, which arise more than three feet high, sending forth many lateral branches.—The upper parts of these are adorned with many white star-shaped flowers, which grow in long spikes flowering gradually upward. They come out in the beginning of June, and the seeds ripen in autumn.

5. ASPHODELUS STULOSUS, or annual branching spiderwort, hath roots composed of many yellow fleshy fibres: the leaves are spread out from the crown of the root, close to the ground, in a large cluster; these are convex on their under side, but plain above. The flower-stalks rise immediately from the root, and grow about 2 feet high, dividing into 3 or 4 branches upward, which are adorned with white starry flowers, with purple lines on the outside. These flower in July and August, and their seeds ripen in October.

(3.) ASPHODELUS, CULTURE OF THE. The way to increase these plants is by parting their roots in August, before they shoot up their fresh green leaves. They may also be raised from seeds sown in August; and the August following the plants produced from these may be transplanted into beds, and will produce flowers the second year. They must not be planted in small borders, among tender flowers; for they will draw away all the nourishment, and starve every thing else. The Lancashire asphodel is thought to be very noxious to sheep, whenever, through poverty of pasture, they are necessitated to eat it; although they are said to improve much in their flesh at first, they afterwards die with symptoms of a diseased liver. This is the plant of which such wonderful tales have been told by Pauli, Bartholine, and others, of its softening the bones of such animals as swallow it; and which they thence called *gramen ossifragum*. Horned cattle eat it without any ill effect.

ASPHURELATA, in natural history, are semimetallic fossils, fusible by fire, and not malleable in their purest state, being in their native state intimately mixed with sulphur and other adventitious matter, and reduced to what are called *ores*. Of this series of fossils there are only five bodies, each of which makes a distinct genus; viz. antimony, bismuth, cobalt, zinc, and quicksilver.

ASPHYXIA, [from *a* negative, and *σφύξω*, a pulse,] among ancient physicians, a privation or cessation of the pulse, through the whole body, and all its arteries. Strictly speaking, no such cessation can ever happen except in death; but in some cases, the pulse is so remiss and languid, as not to be perceivable by the touch. Hence the asphyxia is considered as an attendant of deep faintings, or deliquiums; and amounts to much the same with what is otherwise called *lipo-psychia* or *syncope*. Mr Sage has lately published a treatise, recommending the volatile alkali fluor as the

most effectual remedy in atrophy. **ASPHYXIA** is also used by some for a privation of pulse in a part of the body, e. gr. in the arm, &c.

(1.) **ASPIC**, in botany, a plant which grows in plenty in Languedoc, in Provence, and especially on the mountain of St Baume, in France. It is a kind of lavender, nearly like what grows in our gardens; both with regard to the figure and colour of its leaves and flowers. The botanists call it *lavendula mas*, or *spica nardi*, *pseudo nardus*, &c.

(2.) * **ASPICK**. *n. f.* [See **ASP.**] The name of a serpent.—

Why did I 'scape th' invenom'd *aspick's* rage,
And all the fiery monsters of the desert,
To see this day? *Addison.*

ASPICUETA, Martin de, commonly called **DOCTOR NAVARRUS**, was descended of a noble family, and born in 1491, at Varasayn, in Navarre. He entered very young into the monastery of regular canons at Roncevaux, where he took the habit, which he continued to wear after he left the convent. He studied classical learning, natural and moral philosophy, and divinity, at Alcála, in New Castile, adopting chiefly the system of Petrus Lombardus. He studied the law at Ferrara, and taught it with applause at Toulouse and Cahors. After being first professor of canon law at Salamanca for 14 years, he quitted that place to be professor of law at Coimbra, with a larger salary. The duties of this office he discharged for the space of 20 years, and then resigned it to retire into his own country where he took care of the daughters of his deceased brothers. Having made a journey to Rome to plead the cause of Bartholomeo de Caranza archbishop of Toledo, who had been accused of heresy before the tribunal of the inquisition in Spain, and whose cause was, by the Pope's order, to be tried in that city, Aspicueta's writings, which were well known, procured him a most honourable reception. Pope Pius V. made him assistant to cardinal Francis Aciat, his vice-penitentiary; and Gregory XIII. never passed by his door without calling for him, and stopped sometimes a whole hour to talk with him in the street. His name became so famous, that even in his lifetime the highest encomium on a learned man was to call him *a Navarrus*. He was consulted as an oracle. By temperance he prolonged his life to a great length. His economy enabled him to give substantial proof of his charity. Being very old, he used to ride through the city, and relieve all the poor he met; to which his mule was so well accustomed, that it stopped of its own accord at the sight of every poor man till its master had relieved him.—He refused several honourable posts in church and state, that he might have leisure to correct and improve the works he had written, and compose others. He died in 1586, aged 94. He wrote a vast number of treatises on morality and canon law.

ASPILATES, or **ASPLENITES**, in the writings of the ancients, the name of a stone, famous for its virtues against the spleen, and many other disorders; it was to be applied externally, and fastened to the part with camel's hair.

ASPINY, or **ANGLIARY-THORN**, a drug used

in medicine, on which particular duties are imposed, by the tariff of the custom-house at Lyons.

(1.) * **ASPIRATE**. *adj.* [*aspiratus*, Lat.] Pronounced with full breath.—For their being precious, you may call them, if you please, *perspirate*; but yet they are not *aspirate*, i. e. with such aspiration as *b. Holder*.

(2.) **ASPIRATE**, in grammar, denotes words marked with the spiritus asper. See **ASPER** N.

(1.) * **To ASPIRATE**. *v. a.* [*aspiro*, Lat.] To pronounce with aspiration, or full breath; as we *aspirate horse, house, and bog*.

(2.) * **To ASPIRATE**. *v. n.* [*aspiro*, Lat.] To be pronounced with full breath.—Where a vowel ends a word, the next begins either with a consonant, or what is its equivalent; for our *a* and *b* *aspirate*. *Dryden*.

* **ASPIRATION**. *n. f.* [*aspiratio*, Lat.] 1. A breathing after; an ardent wish: used generally of a wish for spiritual blessings.—A soul inspired with the warmest *aspirations* after celestial beatitude, keeps its power attentive. *Watts*. 2. The act of aspiring, or desiring something high and great.—

'Tis he; I ken the manner of his gate;
He rises on his toe; that spirit of his
In *aspiration* lifts him from the earth. *Shakspeare*.
3. The pronunciation of a vowel with full breath.—*H* is only a guttural *aspiration*, i. e. a more forcible impulse of the breath from the lungs. *Reverend*.

* **To ASPIRE**. *v. n.* [*aspiro*, Lat.] 1. To desire with eagerness; to pant after something higher. Sometimes with the particle *to*.—Most excellent lady, no expectation in others, nor hope in herself, could *aspire to* a higher mark, than to be thought worthy to be praised by you. *Shakspeare*. His father's grave counsellors, by whose counsel he had *aspired to* the kingdom, he cruelly tormented. *Knolles*.—

Hence springs that universal strong desire,

Which all men have of immortality:

Not some few spirits unto this thought *aspire*,

But all men's minds in this united be. *Dante*

Horace did ne'er *aspire to* epic bays:

Nor lofty Maro stoop to lyric lays. *Reverend*

Till then a helpless, hopeless, homely swain
I sought not freedom, nor *aspir'd to* gain. *Dryden*

Aspiring to be gods, if angels fell,

Aspiring to be angels, men rebel. *Pope*

2. Sometimes with *after*.—Those are raised above sense, and *aspire after* immortality, who believe in the perpetual duration of their souls. *Tillotson*.—There is none of us but who would be thought throughout the whole course of his life, to *aspire after* immortality. *Atterbury*. 3. To rise; to tower.—

There is betwixt that smile we would *aspire to*,
That sweet aspect of princes and our ruin,
More pangs and fears than war or women have. *Shakspeare*

My own breath still foment the fire,
Which flames as high as fancy can *aspire*. *Wallington*

* **ASPIRER**. *n. f.* [from *aspire*.] One that ambitiously strives to be greater than he is.—

Thy

They ween'd

To win the mount of God ; and on his throne,
To set the envier of his state, the proud
Inspire : but their thoughts prov'd fond and
vain. *Milton.*

ASPIUS, in ichthyology, a species of the cypri-
belonging to the abdominal order. It is met
in the lakes of Sweden.

ASPLENITES. See ASPILATES.

ASPLEY, 3 English villages ; viz. 1. and 2. in
Hampshire, near Penkridge, and 3 miles S. W.
Standon : and 3. in Warwickshire near Tam-
worth.

ASPLEY-GUISE, a village near Woodburn, in
Hampshire.

ASPLEY-WICKFORD, a village near Tamworth,
Hampshire.

ASPORTATION. *n. f.* [*asportatio*, Lat.] A
carrying away. *DiB.*

ASPY, a village in Lincolnshire, a little N. of
Lendale.

ASQUINT. *adv.* [from *a* and *squint*.] Obli-
quely ; not in the straight line of vision.—A single
eye may direct the way better than five hun-
dred, who have contrary views, or look *asquint* ;
but their eyes. *Swift.*

ISRAEL, the angel, according to the Maho-
metan system, who is appropriated to take care
of the souls of those who die.

1.) * ASS. *n. f.* [*asinus*, Lat.] 1. An animal of
this kind, remarkable for sluggishness, patience, har-
shness, coarseness of food, and long life.—

You have among you many a purchas'd slave,
Which, like your *asses*, and your dogs and
mules,

you use in abject and in slavish part,
Because you bought them. *Shakespeare.*

A stupid, heavy, dull fellow ; a dolt.—

I do begin to perceive that I am made an *ass*.

Shakespeare.

That such a crafty mother

should yield the world to this *ass*!—a woman
that

kears all down with her brain ; and yet her son
cannot take two from twenty for his heart,
and leave eighteen. *Shakespeare.*

2.) ASS, in zoology. See EQUUS.

3.) ASS, CORONATION OF THE, in antiquity,
a part of the ceremony of the feast of Vesta,
when the bakers put crowns on the heads of
the quadrupeds ; *Ecce coronatis panis dependit*
his ! Hence, in an ancient calendar, the ideas
of June are thus denoted ; *Festum est Vestæ. Asi-*
cornatur !—This honour, it seems, was done
the beast, because, according to the mythology,
its braying, it had saved Vesta from being ra-
ped by the Lampacan god ! Hence the formula—
Vestæ delictum est asinus.

ASSABA, the name given by the people of
India to a shrub which they boil in water, and
use on a bubo, and it proves a cure.

ASSAC, or ASSAX, in the materia medica of
the ancients, the name given by the Arabians to
gum ammoniac of the Greeks ; but by many
the qualities attributed to this drug, it does not
seem to be the same that is now called so.

ASSACH, or ASSATH, a kind of purgation, an-
ciently used in Wales, by the oaths of 300 men.

ASSA DULCIS. See BENZOIN.

ASSA FORTIDA. See ASA, N° II. § 4, and 5.

ASSAI, in music, signifies quick ; or according
to others, that the motion of the piece be kept in
a middle degree of quickness or slowness : As,
assai allegro, assai presto. See ALLEGRO and
PRESTO.

* To ASSAIL. *v. a.* [*assailler*, Fr.] 1. To at-
tack in a hostile manner ; to assault ; to fall upon ;
to invade.—

So when he saw his flatt'ring arts to fail,
With greedy force he 'gan the fort t' assail.

Fairy Queen.

2. To attack with argument ; censure ; or mo-
tives applied to the passions.—

My gracious lord, here in the parliament

Let us assail the family of York. *Shakespeare.*

She will not stay the siege of loving terms,

Nor bide th' encounter of assailing eyes. *Shakespeare.*

How have I fear'd your fate ! but fear'd it
most,

When love assail'd you on the Libyan coast.

Dryden.

All books he reads, and all he reads assails,

From Dryden's Fables down to D—y's Tales.

Pope.

In vain Thalestris with reproach assails ;

For who can move when fair Belinda fails ? *Pope.*

* ASSAILABLE. *adj.* [from *assail*.] That which
may be attacked.—

Banquo, and his Fleance, lives.—

But in them nature's copy's not eternal.—

There's comfort yet, they are assailable. *Shakespeare.*

(1.) * ASSAILANT. *adj.* Attacking ; invading.

And as evening dragon came,

Assailant on the perched roofs

Of tame villatick fowl.

Milton.

(2.) * ASSAILANT. *n. f.* [*assaillant*, Fr.] He
that attacks ; in opposition to *defendant*.—The
same was so well encountered by the defendants,
that the obstinacy of the *assailants* did but increase
the loss. *Hayward.*

I'll put myself in poor and mean attire,

And with a kind of umber smirch my face,

The like do you ; so shall we pass along,

And never stir assailants.

Shakespeare.

* ASSAILER. *n. f.* [from *assail*.] One who at-
tacks another.—Palladius heated, so pursued our
assailers, that one of them slew him. *Sidney.*

ASSAM, a country of Asia, bounded on the
W. by Bengal and Bootan ; on the N. by the
mountains of Thibet and on the S. E. and S. by
Meckley. The Burrampooter runs through the
whole length of it. Gerghon is the capital. Assam
lies between Long. 91° and 96° and between Lat.
25° and 30° N.

ASSAMESE, the inhabitants of Assam. They
are fond of the flesh of dogs. They live comfor-
tably, however ; and as their king is sole pro-
prietor of all the gold, silver, and other metals in
his kingdom, they pay no taxes. Almost every
house-keeper has an elephant. The invention of
gun powder is by some ascribed to them.

ASSANCALE, } a strong town in Armenia,
ASSANCALE, } near the river Arras, in the
road between Erzerum and Erivan, noted for its
hot baths. It stands on a high hill, 22 m. E. of
Erzerum ; the walls are built in a spiral line all
round

round the rock, and it is strengthened with square towers. The ditch is about two fathoms over, cut out of hard rock. Long. 41. 10. E. Lat. 39. 46. N.

ASSANCHIF, a town of Asia in Diarbekir, seated on the Tigris, 40 miles S. E. of Diarbekir. Long. 42. 10. E. Lat. 37. 50. N.

ASSANDUM. See **ASHOWN**.

ASSANS. See **ASSANS**.

* **ASSAPANICK** *n. f.* A little animal of Virginia, which is said to fly by stretching out its shoulders and its skin, and is called in English the flying squirrel. *Troglodytes*.

ASSAPOORY, an natural history, a name given by the people of the East Indies to a peculiar species of fish, which they use in medicine, reducing it to powder, and dressing it on burning coals, and the sick person may receive the fumes of it. It is principally used for children, when they are disordered by taking cold. The smell of it, while burning, is very offensive.

ASSARABACCA. See **ASARABACCA**, and **ASARUM**, § 1.

ASSARIUM, a small copper coin, being a part of the *as*. The word is used by Budas indifferently with *as*, and *nummus*, to denote a small piece of money; in which he is followed by Cujacius, who defines *assarius*, by *nummus auri minime*. We find mention of the *assarius* in Matthew, chap. x. ver. 29, translated, a farthing.

ASSARON, an ancient Jewish measure of capacity, equal to the tenth part of an ephah. The *assaron* is the same with the *omer*. Josephus calls it *assaron*; in the Hebrew it is written *assarith*. It was the measure of manna appointed for each person.

* **ASSART** *n. f.* *Assert*, from *assort*, Fr. to clear away wood in a forest. An offence committed in the forest, by plucking up thorn woods by the roots, that are thickets or coverts of the forest, and by making them as plain as arable land. *Covert*.

* *To ASSART*, *v. n.* [*Assart*, Fr.] To commit an *assart*. See **ASSART**.

ASSASIN. See next article.

(1.) **ASSASSIN**, **ASSASSINATE**, *n. f.* *Assassin*, Fr. a word brought originally from Asia, where, about the time of the holy war, there was a set of men called *assassins*, as is supposed for *Arseus*, who killed any man, without regard to danger, at the command of their chiefs. A murderer; one that kills by treachery, or sudden violence. In the very moment as the knight withdrew from the duke, this *assassin* gave him, with a back blow, a deep wound into his left side. *Wotton*.

The Syrian king, who, to surprise one man, *assassin*-like, had levy'd war, Was unproclaim'd. *Milton*.

—The old king is, pit murdered, and the person that did it is unknown.—Let the soldiers seize him for one of the *assassins*, and let me alone to accuse him afterwards. *Dryden*.

Here he's *assassin*, for their gain invade, And teach new powers urge their fatal trade.

—When he hears of a murder, he enlarges more on the guilt of the suffering person, than of the *assassin*. *Addison*.

ASSASSIN, a name given to the persons who slew the *assassin*, and gave to his name.

The vile *assassin*, and his villainous name. *Pope*.

Useful, we grant, it serves what life requires. *Pope*.

But dreadful too, the dark *assassin* here. *Pope*.

(2.) **ASSASSIN**, **ASSASSINATION**, &c. The word *assassin* is said to have taken its rise from a prince of the family of the *Arseus*, popularly called *Assaf*, who lived in a cleft between the rock and *Emmanuel*, and brought up a number of young men, ready to pay a blind obedience to his commands; whom he employed in murdering the princes with whom he was at enmity.

According to Mr Volney, the word *Assaf* is the root *Assaf*, to kill, to assassinate, to slay (surprise); in the vulgar Arabic signifies *hiding*; and the night, persons who *lie in wait* to kill, is very universally understood in the Levant, from *Assaf*, who slew by surprise. See *Assassin*, § 1.

There was a certain use of taking, received in all the republics of Greece and Rome especially, after the expulsion of the king, the law was formal and solemn, and it was admitted. The commonwealth aimed at the of any citizen, and created him magistrate, that moment.

ASSASSINATE, *n. f.* [from *Assaf*] To commit an *assassin*; murder. What our law calls, and popular indignation would punish, is them from punishment; *Pope*.

* *To ASSASSINATE*, *v. a.* [from *Assaf*] To murder by violence.—Help, neighbours, the murder is broken up by force, and I am resolved, to be *assassinated*. *Dryden*.

What could provoke thy madness To *assassinate* so great, to brave a man, To way-lay; to take by treachery. *Thomson*.

Such usage as your honourable lord Afford us, *assassinate* and betray. *Who dare not, with your whole united power, In fight with hand and eye single and sworn to.*

ASSASSINATION, *n. f.* [from *Assaf*] The act of assassination; murder by violence. It were done quickly, if it *assassinate* Could trammel up the consequence.

The duke smother'd his course by a *assassination*.

* **ASSASSINATOR**, *n. f.* [from *Assaf*] Murderer; mankiller; the person that kills by violence.

(1.) **ASSASSINS**, a tribe or clan of the Arabian Ismaelians and BATAKIA, who lived in the Karmania, a famous country between the Mahometans, who settled in Persia about the year 1050, whence, in process of time, they a colony into Syria, where they became the of a considerable tract of land about the town of Lebanon, extending into the neighbourhood of Antioch to Damascus.

(2.) **ASSASSINS**, a name given to the chief and legislator of this extraordinary sect, who is said to have been *Ismael Sabah*, a man of

tor, who by his artifices made fanatical and licit slaves of his subjects. Their religion was founded of that of the Magi, the Jews, the Christians, and the Mahometans: but the capital article of their creed was to believe that the Holy Ghost resided in their chief; that his orders proceeded from God himself, and were real declarations of divine pleasure. To this monarch the orient gave the name of *Scheik*: but he is better known in Europe by the name of the *Old Man of the Mountain*. His dignity, instead of being hereditary, was confirmed by election; where, metaphorically, that is, a superior multiplicity and enormity of crimes, was the most effectual recommendation to a majority of suffrages. This chief, from his fixed residence on the summit of mount Lebanon, like a vindictive deity, with the thunderbolt in his hand, sent inevitable death to all quarters of the world; so that from one end of the earth to the other, khaliffs, emperors, sultans, kings, princes, Christians, Mahometans and Jews, every man and people, execrated and dreaded his fanatical power, from the strokes of which there was no security. At the least suggestion or whisper, that he had threatened the death of any potentate, immediately doubled their guards, and took every precaution in their power. Philip Augustus, king of France, on advice that the *Scheik* intended to have him assassinated, instituted a new guard of men distinguished for their activity and courage, called *sergens d'Armes*, with brass armour, bows and arrows; and he himself never appeared without a club, fortified either with iron or gold. Most sovereigns paid secretly a pension to the *Scheik*, however scandalous and derogatory it might be to the lustre of majesty, for the safety of their persons. The Knights Templars alone refused to defy his secret machinations and open defiance. Indeed they were a permanent dispersed army, not to be cut off by massacres or assassinations. This barbarous prince was furnished with resources unknown to all other monarchs, even to the most absolute despotic tyrants. His subjects would prostrate themselves at the foot of his throne, requesting to die by his hand or order, as a favour by which they were sure of passing into paradise. On them if danger made any impression, it was an emulation to press forward; and if engaged in any enterprise, they went to the place of action with a magnanimity unknown to others. Henry count of Champagne, who married Isabel, daughter of Amaury king of Jerusalem, passing through part of the territory of the Assassins in his way to Syria, and talking highly of his power, a chief came to meet him, "Are your subjects as ready in submission as mine?" and, without staying for an answer, made a sign with his hand, when ten armed men in white, who were standing on an adjacent tower, instantly threw themselves down. On another occasion, Sultan Malek-Shah summoning the *Scheik* to submit himself to his government, and threatening him with the power of his arms, should he hesitate to comply; the latter, feigning composedly turning himself towards his guards, said to one of them, "Draw your dagger and plunge it into your breast;" and to another, "Throw yourself headlong from yonder

rock." His orders were no sooner uttered than they were joyfully obeyed: and all the answer he designed to give the sultan's envoy was, "Away to thy master, and let him know I have many thousand subjects of the same disposition." Men so ready to destroy themselves were equally alert and resolute in being the ministers of death to others. At the command of their sovereign, they made no difficulty of stabbing any prince, even on his throne; and being well versed in the different dialects, they conformed to the dress and even the external religion of the country, that they might with less difficulty strike the fatal blow required by their chief. With the Saracens they were Mahometans; with the Franks, Christians; in one place they joined with the Mamaluks; in another, with the ecclesiastics or religious; and under this disguise seized the first opportunity of executing their sanguinary commission. Of this we meet with an instance in the history of Saladin, while he was besieging Manbedge, the celebrated Hieropolis of antiquity. Being one day, with a few attendants, and they at some distance, reconnoitring the place for the better disposition of the attack, a man rushed on him with a dagger in his hand, and wounded him in the head; but the sultan, as he was endeavouring to repeat his stroke, wrested the dagger from him, and, after receiving several wounds, laid him dead at his feet. Before the sultan had well recovered himself, a second encountered him to finish the treachery of the former; but he met with the same fate: he was succeeded with equal fury by a third, who also fell by the hand of that magnanimous prince whom he was sent to assassinate. And it was observed, that these wretches dealt about their fruitless blows as they lay in the agonies of death. With such rapidity was this transacted, that it was over before Saladin's guards could come to his assistance. He retired to his tent, and in great perturbation throwing himself on his sofa, ordered his servants to take a strict view of his household, and to cashier all suspected persons; at the same time asking with great earnestness, "Of whom have I deserved such treacherous usage?" But it afterwards appeared, that these villains had been sent by the old man of the mountain; of whom the vizir Kamschlegin had purchased the murder of Saladin, to free himself from so great a warrior whom he could not meet in the field. To animate them in their frantic obedience, the *Scheik*, before their departure on such attempts, used to give them a small foretaste of some of the delights which he assured them would be their recompense in paradise. Delicious soporific drinks were given them; and while they lay asleep, they were carried into beautiful gardens, where every allurement invited their senses to the most exquisite gratifications. From these seats of voluptuousness, inflamed with liquor and enthusiastic views of perpetual enjoyments, they sallied forth to perform assassinations of the blackest dye. This people once had, or at least they pretended to have, an intention of embracing the Christian religion. They reigned a long time in Persia and on Mount Lebanon. In 1213, they assassinated Lewis of Bavaria. Hulaku, a khan of the Mogul Tartars, in the year 655 of the Hegira, or 1254 of the Christian era, entered

afflicted their country and dispossessed them of several places. In 1257, the Tartars conquered them and killed their prince; but it was not till 1272 that they were totally extirpated. This achievement was owing to the conduct and intrepidity of the Egyptian forces sent against them by the sultan Bibaris. It has, however, been thought that the Druses, who still reside among the eminences of Mount Lebanon, and whose religion and customs are so little known, are a remnant of those barbarians.

ASSATH. See ASSACH.

* ASSATION. *n. f.* [*assatus*; roasted, Lat.] Roasting.—The egg expiring less in the elixation or boiling; whereas, in the *assation* or roasting, it will sometimes abate a drachm. *Brown's Vulg. Er.*

(1.) ASSAULT. *n. f.* [*assault*, French.] 1. Attack; hostile onset: opposed to *defence*.—Her spirit had been invincible against all *assaults* of affection. *Shakespeare*.—

Not to be shook thyself, but all *assaults*,
Baffling, like thy hoar cliffs the loud sea wave.

Thomson.

2. Storm; opposed to *sap* or *siege*.—Jason took at least a thousand men, and suddenly made an *assault* upon the city. 2 *Mac.* v. 5.—After some days *siege*, he resolved to try the fortune of an *assault*: he succeeded therein so far, that he had taken the principal tower and fort. *Bacon*. 3. Hostile violence.—

Themselves at discord fell,

And cruel combat join'd in middle space,

With horrible *assault*, and fury fell. *Fairy Queen.*

4. Invasion; hostility; attack.—After some unhappy *assaults* upon the prerogative by the parliament, which produced its dissolution, there followed a compofure. *Clarendon*.—Theories built upon narrow foundations, are very hard to be supported against the *assaults* of opposition. *Locke*. 5. In law.—A violent kind of injury offered to a man's person. It may be committed by offering of a blow, or by a fearful speech. *Cowel*. 6. It has *upon* before the thing assaulted.

(2.) ASSAULT, in law, is an attempt or offer to beat another, without touching him: as if one lifts up his cane or his fist in a threatening manner at another; or strikes at him, but misses him; this is an *assault*, *insultus*, which Finch describes to be "an unlawful setting upon one's person." This also is an inchoate violence, amounting considerably higher than bare threats; and therefore, though no actual suffering is proved, yet the party injured may have redress by action of *trespass vi et armis*, wherein he shall recover damages as a compensation for the injury.

(3.) ASSAULT, in the military art, a furious effort made to carry a fortified post, camp, or fortress, wherein the assailants do not screen themselves by any works: while the assault continues, the batteries cease, for fear of killing their own men. The *enfants perdus* march first to the assault. See ENFANS PERDUS.

* To ASSAULT. *v. a.* [from the noun.] To attack; to invade; to fall upon with violence.—The king granted the Jews to gather themselves together, and to stand for their life, to destroy all that would *assault* them. *Esab.* viii. 11.

Before the gates the cries of babes new-born,
Whom fate had from their tender mother torn,
Assault his ears. *Dryden*

New cursed steel, and more accursed gold,
Gave mischief birth, and made that mischief bold:

And double death did wretched man invade,
By steel *assaulted*, and by gold betray'd. *D. D.*

* ASSAULTER. *n. f.* [from *assault*.] One who violently assaults another.—Neither liking their eloquence, nor fearing their might, we esteemed few swords in a just defence, able to resist many unjust *assaulters*. *Sidney*.

ASSAY. See ASSAC.

(1.) * ASSAY. *n. f.* [*essaye*, Fr. from which the ancient writers borrowed *assay*, according to the sound, and the latter, *essay*, according to the writing; but the senses now differing, they may be considered as two words.] 1. Examination; trial.

This cannot be

By no *assay* of reason. 'Tis a pageant,
To keep us in false gaze. *Shakespeare*

2. In law. The examination of measures and weights used by the clerk of the market. *Cowel*.

3. The first entrance upon any thing; a trial.—

For well he weened, that so glorious bait
Would tempt his guest to take thereof *assay*.

Fairy Queen

4. Trial by danger or distress; difficulty; hardship.—

She heard with patience all the end,
And strove to master sorrowful *assay*. *Fairy Queen*

The men he prest but late,
To hard *assays* unfit, unsure at need,
Yet arm'd to point in well attempted plate.

Fairy Queen

Be sure to find,

What I foretel thee, many a hard *assay*
Of dangers, and adversities, and pains,
Ere thou of Israel's sceptre get fast hold. *Milton*

(2.) ASSAY, ESSAY, or SAY, in metallurgy, the proof or trial of the goodness, purity, &c. of metals and metalline substances. See SAY. In ancient statutes, this is called the *touch*, and those who had the care of it, *Keepers of the Touch*. Under Henry VI. divers cities were appointed to have touch for wrought silver plate. Henry VI. c. 14. By this, one might imagine that they had no better method of assaying than the simple one by the touch stone; but the case was far otherwise. In the time of king Henry VI. the bishop of Salisbury, then treasurer, considering, that though the money paid into the king's exchequer, for his crown rents, did answer *numero et pondere*, (in number and weight, it answered), nevertheless be mixed with copper or brass, wherefore a constitution was made, called *trial by combustion*; which differs little or nothing from the present method of assaying silver. See a description of it in the Black Book in the Exchequer, written by Gervase of Tilbury, c. 12. This trial is also there called *essaim*, and the officer who made it is named *fuor*. The method still in use of assaying gold and silver was first established by an act of the English parliament, 1354.

* **TO ASSAY.** *v. a.* [*assayer*, Fr.] 1. To make trial of; to make experiment of.—

One that to bounty never cast his mind,
Ne thought of honour ever did *assay*
His baser breast.

Spenser.

Gray and Bryan obtained leave of the general little to *assay* them; and so with eight horsemen urged them home. *Hayward*.—What unweighed behaviour hath this drunkard picked out of my conversation, that he dares in this manner *assay* me? *Shakespeare*. 2. To apply to, as the touchstone in *assaying* metals.—

Whom thus afflicted, when sad Eve beheld,
Desolate where she sat, approaching nigh,
Soft words to his fierce passion she *assay'd*.

Milton.

To try; to endeavour.—David girded his sword upon his armour, and he *assayed* to go, for he had not proved it. *1 Sam. xvii. 39.*

ASSAY-BALANCE. See **BALANCE**.

* **ASSAYER.** *n. s.* [from *assay*.] An officer of the mint, for the trial of silver, appointed between the master of the mint and the merchants to bring silver thither for exchange *Cowell*.—The smelters come up to the *assayers* within one twenty. *Woodward on Fossils*.

ASSAYING, *ARS DOCIMASTICA*, in its extent, comprehends particular manners of examining every ore, or mixed metal, according to its nature, and the best adapted fluxes; so as to discover, not only what metals, and what proportions of metal, are contained in ores; but likewise how much sulphur, vitriol, alum, arsenic, smelt, &c. may be obtained from every one respectively.—

BLOW-PIPE, **METALLURGY**, and **MINERASTRY**. Assaying is particularly used by coiners and goldsmiths, for trying the purity of the gold and silver to be used in the coining of money, and the manufacture of plate, &c. or that have been already used therein. There are two kinds of assaying; the one before metals are melted, in order to bring them to their proper fineness; the other after they are struck, to see that they be standard. For the first assay, the assayers use to take 15 grains of gold, and half a dram of silver, to be for money; and 18 grains of the one, and half a dram of the other, if for other purposes. The standard is made of one of the pieces of money struck, which they cut in four parts; or by scratching a small quantity of a piece of work. The quantity of gold for an assay among us is six grains; in France, nearly the same; and in Germany, about three times as much. See **ESSAY**.

ASSAY-MASTER, or **ESSAY-MASTER**, an officer entrusted with the care of making true touch, or assay, of the gold and silver brought to him; and giving a just report of the goodness or badness thereof. Such is the assay-master of the mint, and also the king's assay-master; which, in Scotland, has been a sinecure office since the Union.

The assay-master of the goldsmiths company in London is a sort of assistant warden, called also *touch warden*, appointed to survey, assay, and mark all the silver work, &c. committed to him. There are also assay-masters appointed by the city at York, Exeter, Bristol, Chester, Norwich, Newcastle, and Birmingham, for assaying silver and light plate. The assay-master is to retain 8

grains of every pound Troy of silver brought to him; 4 whereof are to be put in the pix, or box of deal, to be re-assayed the next year, by way of check upon him; and the other 4 to be allowed him for waste, in assaying. The number of pennyweights set down in the assay-master's report, is to be accounted so much in every pound of 12 ounces Troy. For every 20 pennyweight, or ounce Troy, the silver is found by the assay to be worse than standard, or sterling, sixpence is to be deducted; because every ounce will cost so much to reduce it to standard goodness, or to change it for sterling. In gold, for every carat it is worse than standard, it is accounted, in the ounce Troy, worse by so many times 3 s. 8 d.; and for every grain it is set down worse, it is accounted worse by so many times 11 d. in the ounce Troy; and for every half grain 5½ d.: for so much it will cost to make it of standard goodness, &c. The incorporation of goldsmiths in Edinburgh have two assay-masters, who are annually elected (or re-elected) from among their own members, and are sworn to do justice to the public.

ASSAYSIARE, in law, to take assessors.

* **ASSECTATION.** *n. s.* [*assessatio*, Lat.] Attendance, or waiting upon. *Diſt.*

* **ASSECUTION.** *n. s.* [from *assequor*, *assessum*, to obtain.] Acquirement; the act of obtaining.—By the canon law, a person, after he has been in full possession of a second benefice, cannot return again to his first; because it is immediately void by his *assessum* of a second. *Ayliffe*.

ASSEDATION, a taxing of the king's farms.

ASSELANI. See **ASLAN**.

ASSELBY, a village in the E. Riding of Yorkshire, N. W. of Howden.

ASSELYN, John, a famous Dutch painter, born in Holland, and the disciple of Isaiah Vandewelde, the battle-painter. He distinguished himself in historical pieces, battles, landscapes, animals, and particularly horses. He travelled into France and Italy; and was so pleased with the manner of Bambocchio, that he always followed it. He first discovered to his countrymen a clear manner of painting landscapes, like Claude Lorraine; instead of the dark brown they had hitherto followed. Asselyn's pictures were much admired at Amsterdam, and sold at high prices. He died in that city in 1660.

(1.) * **ASSEMBLAGE.** *n. s.* [*assemblage*, Fr.] 1. A collection; a number of individuals brought together. It differs from *assembly*, by being applied only, or chiefly, to things; *assembly* being used only, or generally, of persons.—All that we amass together in our thoughts is positive ideas of space or duration. *Locke*. 2. The state of being assembled.—

O Hartford, fitted or to shine in courts

With unaffected grace, or walk the plains,

With innocence and meditation join'd

In soft *assemblage*, listen to my song! *Thomson*.

(2.) **ASSEMBLAGE** signifies, likewise, the things themselves so united. It is also used, in a more general sense, for a collection of various things so disposed and diversified, that the whole produces some agreeable effect.

(1.) * **TO ASSEMBLE.** *v. a.* [*assembler*, Fr.]

To bring into one place. It is used both of persons and things.—And he shall set up an ensign for the nations, and shall *assemble* the outcasts of Israel, and gather together the dispersed of Judah. *Isaiab*, xi. 12.—

He wonders for what end you have *assembled* Such troops of citizens to come to him. *Shakesf.*

(2.) * *To ASSEMBLE*. *v. n.* To meet together.—These men *assembled* and found Daniel praying. *Daniel*.

(1.) *ASSEMBLIES* of the clergy are called *convocations, synods, councils*. The annual meeting of the church of Scotland is called a *General Assembly*: In this assembly his Majesty is represented by his Commissioner, who dissolves one meeting, and calls another, in the name of the *King*, while the Moderator does the same in the name of the *Lord Jesus Christ*.

(2.) *ASSEMBLIES* of the Roman people were called *comitia*.

(3.) *ASSEMBLIES OF THE STATES*. Under the Gothic governments, the supreme legislative power was lodged in an assembly of the states of the kingdom, held annually for the like purposes as our parliaments. In Great Britain and Sweden, such assemblies retain their ancient powers and privileges. There were some feeble remains of them in France and Poland before the late revolutions and counter-revolutions.

(4.) * *ASSEMBLY*. *n. f.* [*assemblee*, Fr.] A company met together.—

They had heard, by fame,

Of this so noble, and so fair *assembly*,

This night to meet here.

Shakespeare.

(5.) *ASSEMBLY*, in the beau monde, an appointed meeting of fashionable persons of both sexes, for the sake of play, dancing, gallantry, conversation, &c.

(6.) *ASSEMBLY*, in the military art, the second beating of a drum before a march; at which the soldiers strike their tents, roll them up, and stand to arms.

ASSEMBY, a village near Thirsk, Yorkshire.

ASSENIPI, one of the United States of America, newly added to the Union.

(1.) *ASSENS*, a district of Denmark, in the province of Funen, which carries on a considerable trade in corn and other productions of the country. It is also called *Asnes*, which signifies the holy promontory. A battle was fought in it; in 1535, wherein Christian III. obtained a decisive victory over Christian II.

(2.) *ASSENS*, a sea-port town of Denmark, situated upon the Little Belt, a strait of the Baltic, which separates the isle of Funen from the continent. It is the common passage from the duchy of Sleswick to Copenhagen. Long. 10. 30. E. Lat. 55. 15. N.

(1.) * *ASSENT*. *n. f.* [*assensus*, Lat.] 1. The act of agreeing to any thing.—

Without the king's *assent* or knowledge,

You wrought to be a legate. *Shak. Hen. VIII.*

—Faith is the *assent* to any proposition, not thus made out by the deduction of reason, but upon the credit of the proposer. *Locke*.—All the arguments on both sides must be laid in balance, and,

on the whole, the understanding determine its

nt. Locke. 2. Consent; agreement.—To urge

any thing upon the church, requiring therefore that religious *assent* of christian belief, wherein the words of the holy prophets are received, and not to shew it in scripture; this did the Fathers evermore think unlawful, impious, and excessive. *Hooker*.—The evidence of God's own testimony, added unto the natural *assent* of reason concerning the certainty of them, doth not a little comfort and confirm the same. *Hooker*.

(2.) *ASSENT*, like faith, is divided into *implicit* and *explicit*; *actual* and *habitual*, &c. See *Faith*.

1. *ASSENT, ACTUAL*, is a determination of the mind, arising from the perception of the truth of any proposition.

2. *ASSENT, HABITUAL*, consists in certain habits of believing or acquiescing, induced in the mind by repeated acts.

(3.) *ASSENT, ROYAL*, the approbation given by the king to a bill in parliament, after which it becomes a law.

* *To ASSENT*. *v. n.* [*assentire*, Lat.] To concede; to yield to, or agree to.—And the Jews *assented*, saying, that these things were so. *xxiv. 9.*

ASSENTAMEN, a Virginian pink. *Bail.*

* *ASSENTATION*. *n. f.* [*assentatio*, Lat.] Compliance with the opinion of another out of flattery or dissimulation.

ASSENTATORY, belonging to flattery.

* *ASSENTMENT*. *n. f.* [from *assent*.] Consent.—Their arguments are but precarious and subsist upon the charity of our *assentments*. *Bract*. *Vulgar Errors*.

ASSENTON, NETHER, } Two villages, near

ASSENTON, UPPER, } Henley, in Oxfordshire.

ASSER, John, or *ASSERIUS MENEVALL* (*i. e.* Asser of St David's,) bishop of Shireburn, during the reign of Alfred the Great. He was born in Pembrokeshire, in S. Wales; and educated in the monastery of St David's by the archbishop Asserius, who, according to Leland, was his uncle. By his assiduous application he soon acquired universal fame as a person of profound learning and great abilities. Alfred, the munificent patron of genius, about the year 880, sent for him to court; then held at Dean in Wiltshire. He was so charmed with Asser, that he made him his preceptor and companion; appointed him abbot of 2 or 3 different monasteries; and at last promoted him to the see of Shireburn, where he died in 909. He was a man of happy genius, wonderful industry, extensive learning, and great integrity. He is said to have been principally instrumental in persuading the king to restore the university of Oxford to its pristine dignity.—He wrote, *De rebus gestis Alfredi*, &c. Lond. 1574, published by Archbishop Parker, in the old Saxon character at the end of *Walsinghami hist.*—Francf. 1601. Oxf. 1722, 8vo. Many other works are ascribed to this author by Gale, Bale, and Pits; but doubtful.

ASSERAC, among the Turks. See *ASSIS*.

ASSERIA, *ASSEZIA*, or *ASISIA*, an ancient town of Liburnia, now in ruins. The vestiges of the walls of Asseria that still remain, and whose circumference is clearly distinguishable above the ground, measure 3600 Roman feet. The town is inclosed by them forms an oblong polygon.

they are built with Dalmatian marble; but not taken from the hill on which they stand, for that furnishes only soft stone. The walls are invested, both inside and out, with this marble: some of the stones are ten feet long, and they are all of considerable dimensions. The thickness of these fortifications is commonly about 8 feet: but at the narrowest extremity, which falls towards the foot of the hill, they are 11 feet thick; and, in some parts, their height still above ground reaches near 30 feet. An antiquary, or even a simple lover of erudition, (the Abbe Fortis observes,) cannot help wishing at PODGRAJE (the modern name of Asseria), that some powerful hand *quicquid sub terra est in apricum proferat*: and such a wish becomes stronger when he reflects, that since the destruction of that city no search has ever been made under ground, with a view to discover any thing curious; and yet these walls doubtless contain a valuable deposit of antiquities, thrown down in heaps, who knows by what cause; perhaps naturally, by an earthquake, or perhaps by sudden inundation of barbarians, which is still possible. The gate now demolished, the considerable height of the walls to be seen in several places without, some pieces of thick walls that still appear levelled to the ground among the bushes, are circumstances which give ground to hope that many costly monuments might be recovered out of these ruins. The magnificence of the remaining wall, and the many pieces of well-cut and fine marble scattered over the contiguous fields, afford sufficient proof that both good and grandeur once flourished in that country. In the midst of the rubbish which covers the ruins of Asseria, the parish-church of the little village stands insulated; it is built of broken pieces of ancient ruins, taken as they happened to be met, mixed with mutilated inscriptions, and fragments of noble cornices.

ASSESIANS, the ancient inhabitants of Asse. Pliny, after having specified the Liburnian tribes that were obliged to attend the congress of Ardonia, adds to the catalogue the free Asserians, *immunesque Asseriates*; and this people, who elected their own magistrates, and were governed by their own municipal laws, were no doubt richer and more powerful than their neighbours.

ASSEJIDA, in botany, a name given by the people of Guinea to a kind of shrub, the leaves of which being chewed are a cure for the colic, to which that people are very subject.

To ASSERT. v. a. [*affero*, Lat.] 1. To maintain; to defend either by words or actions.—*My forefathers have asserted the party which they follow till death, and died for its defence. Dryden.* 2. To affirm; to declare positive. 3. To claim; to indicate a title to.—

Nor can the groveling mind,
In the dark dungeon of the limbs confin'd,
Assert the native skies, or own its heav'nly kind.

Dryden.

(1.) * **ASSERTION. n. s.** [from *assert*] The act of asserting.—If any affirm the earth doth move, and will not believe with us it standeth still; because he hath probable reasons for it, and I have infallible sense or reason against it, I will not quarrel with his *assertion*. *Brown's Vulgar Errors. VOL. II. PART II.*

(2.) **ASSERTION** is rather more accurately defined, a fact or proposition advanced by the assertor, who avows the truth of it.

* **ASSERTIVE. adj.** [from *assert*.] Positive; dogmatical; peremptory.—He was not so fond of the principles he undertook to illustrate, as to boast their certainty; proposing them not in a confident and *assertive* form, but as probabilities and hypotheses. *Glanville.*

* **ASSERTOR. n. s.** [from *assert*.] Maintainer; vindicator; supporter; affirmer.—

Among th' *assertors* of free reason's claim,
Our nation's not the least in worth or fame.

Dryden.

Faithful *assertor* of thy country's cause,
Britain with tears shall bathe thy glorious wound.

Prior.

—It is an usual piece of art to undermine the authority of fundamental truths, by pretending to shew how weak the proofs are, which their *assertors* employ in defence of them. *Atterbury.*

ASSERTORY, affirmative; positive. Bailey.

* **To ASERVE. v. a.** [*assertio*, Lat.] To serve, help, or second. *Dist.*

ASSES, ORDER OF, ASINORUM ORDO, a name given to the Mathurins, or Trinitarians, because they were anciently obliged, in travelling, to ride on asses, instead of horses. This obligation was set aside by Pope Clement IV. in 1267.

ASSESIA. See ASISIA and ASSERIA.

* **To ASSESS. v. a.** [from *assettare*, Ital. To make an equilibrium, or balance.] To charge with any certain sum.—Before the receipt of them in this office, they were *assessed* by the affidavit from the time of the inquisition found. *Bacon.*

* **ASSESSION. n. s.** [*assessio*, Lat.] A sitting down by one, to give assistance or advice. *Dist.*

* **ASSESSMENT. n. s.** [from *To assess*.] 1. The sum levied on certain property. 2. The act of assessing.—What greater immunity and happiness can there be to a people, than to be liable to no laws, but what they make themselves? To be subject to no contribution, *assessment*, or any pecuniary levy whatsoever, but what they vote, and voluntarily yield unto themselves? *Howel.*

* **ASSESSOR. n. s.** [*assessor*, Lat.] 1. The person that sits by another; generally used of those who assist the judge.—

Minos, the strict inquisitor, appears;
And lives and crimes, with his *assessors*, hears.
Round in his urn the blended balls he rows,
Absolves the just, and dooms the guilty souls.

Dryden.

2. He that sits by another as next in dignity.—

To his Son,

Th' *assessor* of his throne, he thus began. *Milt.*

Twice stronger than his sire, who sat above,
Assessor to the throne of thund'ring Jove. *Dryd.*

3. He that lays taxes; derived from *assess*.

(1.) * **ASSETS. n. s.** *without the singular.* [*assess*, Fr.] Goods sufficient to discharge that burden, which is cast upon the executor or heir, in satisfying the testators or ancestors debts or legacies.—Whoever pleads *assets*, saying nothing; but that the person against whom he pleads, hath enough come to his hands, to discharge what is in demand. *Cowel.*

(2.) **Assets**, in law, are either real or personal.

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When

Where a man hath lands in fee simple, and dies seised thereof, the lands which come to his heir are assets real; and where he dies possessed of any personal estate, the goods which come to the executors are assets personal. Assets are also divided into *assets per descent*, and *assets inter maines*.

1. ASSETS BY DESCENT are where a person is bound in an obligation, and dies seised of lands which descend to the heir, the land shall be assets, and the heir shall be charged as far as the land to him descended will extend.

2. ASSETS INTER MAINES are when a man indebted makes executors, and leaves them sufficient to pay his debts and legacies; or where some commodity or profit ariseth to them in right of the testator, which are called *assets in their hands*.

* To ASSEVER. } v. a. [*assevero*, Lat.]

* To ASSEVERATE. } To affirm with great solemnity, as upon oath.

* ASSEVERATION. n. s. [from *asseverate*.] Solemn affirmation upon oath.—That which you are persuaded of, ye have it no otherwise than by your own only probable collection; and therefore such bold *asseverations*, as in him was admirable, should, in your mouths, but argue rashness. *Hooker*.—Another abuse of the tongue I might add; vehement *asseverations* upon slight and trivial occasions. *Ray on the Creation*.—The repetition gives a greater emphasis to the words, and agrees better with the vehemence of the speaker in making his *asseveration*. *Broom's Notes on the Odyssey*.

ASSEWIARE, in old law, to draw water from marshy grounds.

* ASSHEAD. n. s. [from *ass* and *head*.] One slow of apprehension; a blockhead.—Will you help an *asshead*, and a coxcomb, and a knave, a thin-faced knave, a gull? *Shakesp. Hamlet*.

ASSHETON, William, D. D. rector of Beckenham, in Kent, was born in 1641, and educated at Brazen-nose college, Oxford. After entering into orders, he became chaplain to the Duke of Ormond, and was admitted D. D. in 1673. Soon after, he was nominated to a prebend in the church of York, the living of St Antholin, London, and to the rectory of Beckenham in Kent. He was the first projector of the scheme for providing for clergymen's widows, and others, by a jointure payable out of the mercers company. He wrote several pieces against the Papists and Dissenters, and some devotional tracts. He died at Beckenham, in 1711, aged 70.

ASSHILL, a rivulet of Ayrshire, in the parish of Colmonel, which runs into the Stinchiar.

ASSI, the modern name of the ORONTES.

ASSIDEANS, or CHASIDÆANS, [from the Heb. צדיקים, *chasidim*, merciful, pious,] those Jews who resorted to Mattathias to fight for the law of God and the liberties of their country. They were men of great valour and zeal, having voluntarily devoted themselves to a more strict observation of the law than other men. For after the return of the Jews from the Babylonish captivity, there were two sorts of men in their church; those who contented themselves with that obedience only which was prescribed by the law of Moses, and who were called *Zadikim*, i. e. the *righteous*; and those who, over and above the law, superadded the constitutions and traditions of the elders, and o-

ther rigorous observances: these latter were called *Chasidim*, i. e. the *pious*. From the former sprung the Samaritans, Sadducees, and Caraites; from the latter, the Pharisees and the Essenes.

ASSIDENT SIGNS, in medicine, are symptoms which usually attend a disease but not always; hence differing from *pathognomic* signs, which are inseparable from the disease: e. gr. In the pleurisy, a pungent pain in the side; in an acute fever, difficulty of breathing, &c. collectively taken, are pathognomic signs; but that the pain extends to the hypochondrium or clavicle, or that the patient lies with more ease on one side than on the other, are *assident* signs.

ASSIDUI, in Roman antiquity, volunteers who served in the army at their own expence.

* ASSIDUITY. n. s. [*assiduité*, Fr. *assiduitas* Lat.] Diligence; closeness of application.—I have with much pains and *assiduity*, qualified myself to a nomenclator. *Addison*.—Can he, who has undertaken this, want conviction of the necessity of the utmost vigour and *assiduity* to acquit himself of it. *Rogers*.—We observe the address and *assiduity* they will use to corrupt us. *Rogers*.

* ASSIDUOUS. adj. [*assiduous*, Lat.] Constant in application.—

And if by pray'r

Incessant I could hope to change the will
Of him who all things can, I would not cease
To weary him with my *assiduous* cries. —
The most *assiduous* talebearers, and bitter
revilers, are often half witted people. *Gordon of the Tongue*.—In summer, you see the hen give herself greater freedoms, and quitting her care above two hours together; but in winter, by the rigour of the season would chill the principle of life, and destroy the young one, she grows not *assiduous* in her attendance, and stays away but little the time. *Addison*.—

Each still renews her little labour,
Nor justles her *assiduous* neighbour.

* ASSIDUOUSLY. adv. [from *assiduous*.] Diligently; continually.—The trade, that obliges artificers to be *assiduously* conversant with the materials, is that of glass-men. *Boyle*.—The habitable earth may have been perpetually the dry sea, if it is *assiduously* drained and exhausted by the seas. *Bentley*.

ASSIDUUS, or ADSIDUUS, [from *as*, money among the Romans, denoted a rich or wealthy person. Hence we meet with *assiduous* friends *assidui fidejussores*. When Servius Tullius divided the Roman people into five classes, according to the value of their estates, the richer sort who contributed most were denominated *assidui*; and as these were the chief people of business who attended all the public concerns, those who were diligent in their attendances came to be denominated *assidui*.

* To ASSIEGE. v. a. [*assieger*, Fr.] To besiege. Obsolete. *DiD*.—

On th' other side th' *assieged* castles ward
Their stedfast arms did mightily maintain.

(r.) * ASSIENTO. n. s. [In Spanish, a contract or bargain.] A contract or convention between the king of Spain and other powers, for furnishing the Spanish dominions in America with negro slaves.

(1.) **ASSIENTO.** The first contract of this kind was made by the French Guinea Company; and, by the treaty of Utrecht, transferred to the English, who were to furnish 4800 negroes annually.

ASSIGN, in common law, a person to whom thing is assigned, or made over. The word assign is said to have been introduced in favour of natural children; who, because they cannot pass by the name of heirs, are comprized under that of assigns.

To ASSIGN. *v. a.* [*assigner*, Fr. *assigno*, Lat.] To make out; to appoint.—He *assigned* Uriah unto a place where he knew that valiant men were. *Sam. xi. 16.*—The two armies were *assigned* to the leading of two generals, both of them rather courtiers assured to the state, than martial men. *Bacon.*—

Both joining,

As join'd our injuries, one enmity
Against a foe-by doom express *assign'd* us,
That cruel serpent. *Milton.*

—True quality is neglected, virtue is oppressed, and vice triumphant. The last day will *assign* to every one a station suitable to his character. *Addison.* 2. To fix with regard to quantity or value.—There is no such intrinsic, natural, settled value in any thing, as to make any *assigned* quantity of it constantly worth any *assigned* quantity of another. *Locke.* 3. [*in law*] in general, to appoint a deputy, or make over a right to another; particular, to point or set forth, as to *assign* error, is to shew in what part of the process error is committed; to *assign* false judgment, is to declare how and where the judgment is unjust; to *assign* the cessor, is to shew how the plaintiff has suffered, or given over: to *assign* waste, is to shew wherein especially the waste is committed. *Cowell.*

* **ASSIGNABLE.** *adj.* [from *assign*.] That which may be marked out, or fixed.—Aristotle held that it streamed by connatural result and emanation from God; so that there was no instant *assignable* of God's eternal existence, in which the world did not also co-exist. *South.*

ASSIGNABLE MAGNITUDE, in geometry, any finite magnitude.

ASSIGNABLE RATIO, the ratio of any finite quantities.

* **ASSIGNATION.** *n. f.* [*assignation*, French.] An appointment to meet; used generally of love appointments.—The lovers expected the return of this stated hour with as much impatience as if it had been a real *assignation*. *Spectator.*—

Or when a whore, in her vocation,
Keeps punctual to an *assignation*. *Swift.*

A making over a thing to another.

ASSIGNATS, a species of paper currency, issued by the government of France, for sums of different values, to the amount of many thousand millions of livres, to support the credit of the republic, during the course of the revolution. Like the paper dollars of America, and all similar measures adopted by nations in a revolutionary state, they have suffered an astonishing depreciation; though the whole landed property of the nation was pledged for the security of the holders. To remedy the inconveniences arising from this depreciation, which indeed, was a natural consequence not only of the fluctuating state of the

French government, but also of the security being too general, and not *specific*, as all financial securities ought to be, the French Directory have lately issued a new species of currency, called *Mandats Territoriaux*; which instead of resting on the whole landed property of the nation, are bottomed only upon so much of that property, as is equivalent in value to the mass of mandates issued; which is 2400 millions of livres, or 100 millions sterling. See **MANDATS**.

* **ASSIGNEE.** *n. f.* [*assigné*, Fr.] He that is appointed or deputed by another to do any act, or perform any business, or enjoy any commodity. And an *assignee* may be either in deed or in law; *assignee* in deed, is he that is appointed by a person; *assignee* in law, is he whom the law maketh so, without any appointment of the person. *Cowell.*

* **ASSIGNER.** *n. f.* [from *assign*.] He that appoints.—The gospel is at once the *assigner* of our tasks, and the magazine of our strength. *Decay of Piety.*

(1.) * **ASSIGNMENT.** *n. f.* [from *assign*.] Approbation of one thing to another thing or person.—The only thing which maketh any place publick, is the publick *assignment* thereof unto such duties. *Hooker.*—This institution which assigns it to a person, whom we have no rule to know, is just as good as an *assignment* to no body at all. *Locke.*

(2.) **ASSIGNMENT**, may be more accurately defined the act of transferring the interest or property a man has in any thing; or of appointing or setting over a right to another.

(3.) **ASSIGNMENT OF A DOWERY**, is the setting out of a woman's marriage portion by the heir.

ASSILLY, a river in E. Florida.

* **ASSIMILABLE.** *adj.* [from *assimilate*.] That which can be converted to the same nature with something else.—The spirits of many will find but naked habitations; meeting no *assimilables* wherein to re-act their natures. *Brown's Vulgar Errors.*

(1.) * *To ASSIMILATE.* *v. a.* 1. To bring to a likeness, or resemblance.—A ferine and necessitous kind of life would easily *assimilate* at least the next generation to barbarism and ferineness. *Hale.*—They are not over-patient of mixture; but such, whom they cannot *assimilate*, soon find it their interest to remove. *Swift.* 2. To turn to its own nature by digestion.—

Tasting concoct, digest, *assimilate*,

And corporeal to incorporeal turn. *Milton.*—Hence also animals and vegetables may *assimilate* the nourishment; moist nourishment easily changing its texture, till it becomes like the dense earth. *Newton.*

(2.) * *To ASSIMILATE.* *v. n.* [*assimilo*, Lat.] To perform the act of converting food to nourishment.—Birds *assimilate* less, and excrete more, than beasts; for their excrements are ever liquid, and their flesh generally more dry. *Bacon's Natural History.*—Birds be commonly better meat than beasts, because their flesh doth *assimilate* more finely, and secerneth more subely. *Bacon's Natural History.*

* **ASSIMILATENESS.** *n. f.* [from *assimilate*.] Likeness. *Diſt.*

(1.) * **ASSIMILATION.** *n. f.* [from *assimilate*.] 1. The act of converting any thing to the nature or substance of another.—It furthers the — of

A S S (648)

assimilation of nourishment, by some outward elements that make the parts more apt to assimilate. *Bacon's Natural History*. 1. The state of being assimilated, or becoming like something else. 2. A nourishment in a large acceptance, but not in propriety, conferring the body, not repairing it by assimilation, but preserving it by ventilation. *Brown's Vulgar Errors*.—It is as well the extent of duty of our nature, to aspire to an *assimilation* with God, even the most laudable and generous ambition. *Droz's of Paris*.

(2.) *ASSIMILATION*, in physics, is that motion by which bodies convert other bodies related to them, or at least such as are prepared to be converted, into their own substance and nature. Thus, flame multiplies itself upon oily bodies, and generates new flame; air upon water, and produces new air; and all the parts, as well fluids as organised, in vegetables and animals, first attack with some elation or choice, nearly the same common or not very different juices for aliment, and afterwards assimilate or convert them to their own nature.

3. *TO ASSIMULATE*, *v. a.* [*assimulo*, Lat.] To assign; to counterfeit. *Diob.*

ASSIMULATION, *n. f.* [*assimulatio*, Lat.] A dissimbling; a counterfeiting. *Diob.*

ASSINGTON, two villages, viz. 1. in Suffolk, 2 miles N. W. of Nayland. 2. in Suffolk, 3 miles N. W. of Stanning.

(1.) *ASSINT*, or *ASSINT*, [from *agere* int, Oad. 2. c. in and out, affording to the surface of the country,] a parish of Scotland, in the county of Sutherland, on the W. N. W. coast. An arm of the Sea, called *Kiln*, washes it on the N. Mr. McKenzie, the minister, who, in his Statistical report to Sir John Sinclair, gives a particular geographical description of it, estimates the extent of the parish at about 15 miles in breadth, 17 in length, and, calculating all its windings, about 100 in circumference. There are 7 islands belonging to it, viz. Elanaghair, Elanadu, Maule-anan, Oldrey, Crossay, Soay, and Klett. The lofty mountains, heath-covered hills, perpendicular precipices, numerous lakes, winding rivers, awful cataracts, and beautiful valleys, render the scene truly romantic. The climate is healthy, though rainy, and a proof of which several of the natives have lived to 100 years and upwards. The present population is about 1500. The parish has no shipping, although it has several excellent harbours. It has above 5000 black cattle, and abounds in horned, iron, marble, &c. The people marry young, notwithstanding which, the women bear children long &—some even above the age of 50! Good roads and more would greatly improve the parish, and fisheries might be carried on in it with great advantage, to such as have money and spirit to engage in them.

(2.) *ASSINT*, the name of a lofty mountain in the above parish. See No. 3.

ASSIR. See next article.

ASSIR-UTUM, in antiquity, a bloody draught, where treaties were ratified. It was made of wine and blood, called by the ancient Romans *ASSIR*.

ASSIR, in physiology, denotes opium, or a powder made of hemp seed, which being formed into beads about the bigness of chestnuts, is swallowed

by the Egyptians, who are hereby intoxicated and become ecstatic, and full of the most agreeable visions. It is also called by the Turks *ASSIR*.

ASSISA, in old law Latin, an assize. *West's* the following terms still used in the English law.

1. *ASSISA CADENS*, to fall from the assize, or law, is to be non-suited.

2. *ASSISA CADIT* in jure, in whose thing in controversy is so doubtful, that it must necessarily be tried by a jury.

3. *ASSISA CAPI* in manu assise, is when the defendant pleads directly to the assize, without taking any exception to the count, assize, or writ.

4. *ASSISA CONTINUANDA*, a writ directed to the justices, to take an assize for the count, not in time be procured by the party.

5. *ASSISE JUDICIUM*, signifies a judgment of the court, given either against the plaintiff or defendant, for default.

6. *ASSISA NOCTURNI*, an assize of night.

7. *ASSISA PANIS & CEREVISIE*, assize of bread and beer.

8. *ASSISE PROLOCANDA*, an assize directed to the justices of assize, for the day of prolocution on account of the king's business, which the party is employed.

ASSISE or *ASSISE*. See *ASSISE*.

ASSISER. See *ASSISE*.

ASSISIA, a pension.

ASSISIA, in ecclesiastical writers, pronounced in a cathedral church, not in a lower that of canons, thus called, either because they were allowed as *assise* of possession, or *assise*, dilige.

ASSISIO, an episcopal town of Italy, in the duchy of Spoleto, which has a very magnificent cathedral of St. Francis, completed of 1000 steps above another. See *ASSISIO*.

TO ASSIST *v. a.* [*assistere*, It. *assistere*, Lat.] To help.—Receive her in the Lord, to assist her in her weakness, and assist her in her need. *Rom. xvi. 2.*—It is necessary and owing to all our other intellectual faculties, and acquaintance with method will assist one in his reasoning. *Watt's Logic*.—She so long yielded to adultery, but she agreed to the murder of her husband, because on the day of the execution, she was to assist him.

ASSISTANCE, *n. f.* [*assistere*, Lat.] Help; furtherance.—The council of Trent recommends recourse, not only to the prayer of saints, but to their aid and assistance. *Watt's Logic*.—You have abundant assistance by the duke, and were assistance to him, by the duke's aid. *Watt's Logic*.—Let us enter the palace of the duke, by his grace he would lead us, *Watt's Logic*.

(2.) *ASSISTANT*, *adj.* [*assistere*, Lat.] Lending aid.—Some perchance did where he duke, and were assistance to him, by the duke's aid. *Watt's Logic*.—Let us enter the palace of the duke, by his grace he would lead us, *Watt's Logic*.

(3.) *ASSISTANT*, *n. f.* [*assistere*, Lat.] Lending aid.—Some perchance did where he duke, and were assistance to him, by the duke's aid. *Watt's Logic*.—Let us enter the palace of the duke, by his grace he would lead us, *Watt's Logic*.

(4.) *ASSISTANT*, *n. f.* [*assistere*, Lat.] Lending aid.—Some perchance did where he duke, and were assistance to him, by the duke's aid. *Watt's Logic*.—Let us enter the palace of the duke, by his grace he would lead us, *Watt's Logic*.

(5.) *ASSISTANT*, *n. f.* [*assistere*, Lat.] Lending aid.—Some perchance did where he duke, and were assistance to him, by the duke's aid. *Watt's Logic*.—Let us enter the palace of the duke, by his grace he would lead us, *Watt's Logic*.

(6.) *ASSISTANT*, *n. f.* [*assistere*, Lat.] Lending aid.—Some perchance did where he duke, and were assistance to him, by the duke's aid. *Watt's Logic*.—Let us enter the palace of the duke, by his grace he would lead us, *Watt's Logic*.

engaged in an affair not as principal, but as
ary or ministerial.—Some young towardly no-
en or gentlemen were usually sent as *assistants*
tendants, according to the quality of the per-
Bacon. 2. Sometimes it is perhaps only a
word for an attendant.—

The pale *assistants* on each other star'd,
With gaping mouths for issuing words prepar'd.
Dryden.

ASSISTANTS, in trading or public compa-
members who usually have the *whole* power
anaging the company's affairs; and com-
y called the court of assistants.

ASISUS, in ancient law writers, a thing farm-
at for a certain rent, in money or provisions.

ASITHMENT, [from *ad*, to, Lat and *fithe*,
instead of,] a wiregold, or compensation,
pecuniary mulct *quod vice supplicii ad expi-*
um delictum solvitur.

ASIUS LAPIS, in phyiology. See LAPIS AS-

*) ASSIZE. *n. f.* [*assise*, a sitting, Fr.] 1.
sembly of knights and other substantial men,
the bailiff or justice, in a certain place, and
certain time. 2. A jury. 3. An ordinance
tute. 4. The court, place, or time, where
when the writs and processes of *assize* are ta-

Cowel.—The law was never executed by any
es of *assize*, but the people left to their own
Davies on Ireland.

At each *assize* and term we try
thousand rascals of as deep a dye.

Dryden's Juvenal.

by court of justice.—

The judging God shall close the book of fate,
And there the last *assizes* keep,
For those who wake, and those who sleep.

Dryden.

Assize of bread, ale, &c. Measure of price or
Thus it is said, *when wheat is of such a*
price, the bread shall be of such assize. 7. Measure
which we now use *fixe*.—

On high hill's top I saw a stately frame,
In hundred cubits high by just *assize*,
With hundred pillars.

Spenser.

ASSIZE, in old English law books, is de-
d to be an assembly of knights, and other sub-
stantial men, together with a justice, in a certain
ce, and at a certain time: but the word, in its
sent acceptation, implies a court, place, or
re, when and where the writs and processes,
ether civil or criminal, are decided by judge
d jury. All the counties of England are divi-
d into 6 circuits; and 2 judges are assigned by
e king's commission, who hold their assizes
ice a-year in every county (except London and
iddlesex, where courts of *nisi prius* are holden
and after every term, before the chief or other
dge of the several superior courts; and except
e 4 northern counties, where the assizes are ta-
n only once a-year) to try by a jury of the re-
ective counties the truth of such matters of fact
are then under dispute in the courts of West-
minster hall. These judges of assize came into
e in the room of the ancient justices in eyre,
justiciarii in itinere; who were regularly establish-
d, if not first appointed, by the parliament of
Northampton, A. D. 1176, 22 Hen. II. with a

delegated power from the king's great court of
aula regia, being looked upon as members there-
of: and they afterwards made their circuit round
the kingdom once in 7 years for the purpose of
trying causes. They were afterwards directed by
magna charta, c. 12. to be sent into every county
once a-year to take or try certain actions then
called *recognitions* or *assizes*; the most difficult of
which they are directed to adjourn into the court
of common pleas to be there determined. The
itinerant justices were sometimes mere justices of
assize, or of dower, or of goal-delivery, and the
like; and they had sometimes a more general
commission, to determine all manner of causes,
justiciarii ad omnia placita: but the present jus-
tices of assize and *nisi prius* are more immediately
derived from the statute Westm. 2. 13 Edw. I. c.
30. explained by several other acts, particularly
the statute 14 Edw. III. c. 16. and must be two
of the king's justices of the one bench or the other,
or the chief baron of the exchequer, or the king's
scurieant's sworn. They usually make their cir-
cuits in the respective vacations after Hilary and
Trinity terms; assizes being allowed to be taken
in the holy time of Lent by consent of the bi-
shops at the king's request, as expressed in statute
Westm. 1: 3 Edw. I. c. 51. And it was also us-
al, during the times of popery, for the prelates
to grant annual licences to the justices of assize to
administer oaths in holy times: for oaths being of
a sacred nature, the logic of those deluded ages
concluded that they must be of ecclesiastical cog-
nizance. The prudent jealousy of our ancestors
ordained that no man of law should be judge of
assize in his own country: and a similar prohibi-
tion is found in the civil law, which has carried
this principle so far, that it is equivalent to the
crime of sacrilege, for a man to be governor of
the province in which he was born, or has any
civil connection. The judges upon their circuits
now sit by virtue of 5 several authorities. 1. The
commission of the *peace*, in every county of the
circuits; and all justices of the peace of the coun-
ty are bound to be present at the assizes; and she-
riffs are also to give their attendance on the
judges, or they shall be fined. 2. A commission
of *oyer and terminer*, directed to them and many
other gentlemen of the county, by which they are
empowered to try treasons, felonies, &c. and this
is the largest commission they have. 3. A com-
mission of general *goal-delivery*, directed to the
judges and the clerk of assize associate, which gives
them power to try every prisoner in the goal com-
mitted for any offence whatsoever, but none but
prisoners in the goal; so that one way or other
they rid the goal of all the prisoners in it. 4. A
commission of *assize*, directed to the judges and
clerk of assize, to take assizes; that is to take the
verdict of a peculiar species of jury called *an assize*,
and summoned for the trial of *landed* disputes.—
The other authority is, 5. That of *nisi prius*, which
is a consequence of the commission of *assize*, be-
ing annexed to the office of those justices by the
statute of Westm. 2. 13 Edw. I. c. 30. And it
empowers them to try all questions of fact issuing
out of the courts of Westminster, that are then
ripe for trial by jury. The original of the name
is this; all causes commenced in the courts of
West-

Witchamper hall are by the count of the courts appointed to be there tried, on a day fixed in some Easter or Michaelmas term, by a jury returned from the county wherein the cause of action arises, but with this proviso, *non prius iudicium ad officia respondens venient; nisi forte* before the day prefixed the judges of assize come into the county in question. Thus they are sure to do in the vacations preceding each Easter and Michaelmas term, and there dispose of all the cause; which gives much expense to all concerned.

(3.) AMBLY, or jury, in Scots law, consists of 25 sworn men (*juratores*), picked out by the court from a greater number, not exceeding 45, who have been summoned for that purpose by the sheriff, and given in list to the defender, at serving him with a copy of his libel.

* To **ASSIZE**, *v. a.* [from the noun.] To fix the rate of any thing by an *assize* or writ.

* **ASSIZER, or ASSISER, n. f.** (from *affine*.) Is an officer that has the care and oversight of weights and measures. *Chambers*.

ASSIZES, GENERAL, in the English law, is when the judges go their circuits.

* **ASSOCIABLE**, *adj.* (*affociabilis*, Lat.) That which may be joined together.

(1.) * ASSOCIATE. *adj.* [from the verb.] *Com-*
federate: joined in interest or purpose,—

While I descend through darkness,

To my affaic's pow'r, them to acquaint
With these faconies.

(a.) * ASSOCIATE *v.* [from the verb.] *z* *z*
 person joined with another: a partner.—The

person joined with another; a partner.—The
persuade the king, now in old age, to make his
gus his *afficiate* in government with him. *Siden-*
a confederate, in a good or neutral sense, &
accomplish in ill.—Their defender, and his *affo-*
ate, have *stithene* proposed to the world a for-
such as themselves like. *Hooker*. 3. A comp-
enon; implying some kind of equality.—He w
accompanied with a noble gentleman, no un-
able *affociate*. *Watson*.—

Sole Evr, *affairs* fine, to me beyond
Compare, above all living creatures dear. *Me*
But my *associates* now my stay deplore,
Immortal. *Prose's Ode*

(J.) ASSOCIATE PREBENDARY, the title first assumed by those clergymen, who associated together, after seceding from the church of Scotland.

(4.) ASSOCIATE SYWOD, the highest ecclesiastical court among the Antiburgher Seceders where its decisions are final, like those of the General Assembly in the Established Church.

(1) * To ASSOCIATE. v. s. [*affocari*, Fr. *socio*, Lat.] : To unite with one another and confederate.—

A fearful army led by Caius Marcius,
Associated with Aufidius, rages
Upon our territories. Shakspeare

4. To unite; to join.—Some designs *unite* unperceivedly associated themselves to it. *Boys* It has generally the particle *and* as, he *associated with* his master's enemies.

(a.) * To ASSOCIATE, v. t. To unite with; to join himself.

(1) **ASSOCIATION.** *n. f.* [from *associare*].
1. Union; conjunction; society.—The church is a society, hath the same laws, and the same which other political societies have, the same indication which all men have unto society, and consent to form certain bonds of society which hold as the law that appertaineth to the order they must be *associated* in. *Hooker*.
2. Confederacy; union for particular purposes. *pr. ill.*—It is could not be done but with the opposition; against which, to liberate in

Opposition.—Against which, in unobscured
selves, they secretly entered into a league of
faction. **Header.** 3. Partnership.—Schismat-
kind of holy association with God, and
king you his partner, interests you in all his
pains. **Exple.** 4. Connection.—Affection
dears is of great importance, and may be of
cellent use. **Motto.** 5. Affection, union of
ties.—The changes of corporeal things are
placed only in the various separations, not
affections and notions of these permanent
things. **Newton.**

(2.) Association, in law, is a person being, either of his own motion, or at the instance of a party plaintiff, to the indices of all other persons associated with them, in order to the office.

(3.) ASSOCIATION OF IDEAS, is when one or more ideas constantly and successively follow one another in the mind, so that one shall almost infallibly produce the other; either there be any natural relation between them, or not. See METAPHYSICS. When there is a real affinity or connection in ideas, it is the Faculty of the mind, to be able to collect, and range them in order, in its acquisition.

where there is none, nor any cause to be
for their accompanying each other, but
owing to mere accident or habit, the
association becomes a strict imperfection,

generally speaking, a main cause of error, or deductions in reasoning. Thus the idea of lines and spirals has really no more

darkness than with light, and yet let a
man inculcate these ideas often on the
child, and raise them there together. A
he shall never be able to separate them
long as he lives, but darkness shall over-
take those frightful ideas. With regard to

stance, however, it must at the same time be served, that the connection alluded to is far from being either unilateral or joint.

APPARITION. Such wrong comparisons as Mr Locke shows, are a great cause of the visible opposition between the different

philosophy and religion for we cannot
that all who hold tenets different from, and
times even contradictory to, our

and wilfully and knowingly impute upon them and refuse truth offered by plain voice and some loose and independent ideas are as follows:

time, custom, and the constant danger of

pled in their minds, that they always appear together: these can no more separate their thoughts, than if they were but one idea, they operate as if they were so. This gives appearance of sense to jargon, of demonstrable absurdities, and of consistency to nonsense. The foundation of the greatest, and almost of all errors in the world. Association forms a great part of Dr Hartley's mechanical theory of the mind. He distinguishes it into synchronous and successive; and ascribes our simple and complex ideas to the influence of this principle or habit. Particular sensations result from previous ideas conveyed through the nerves to the matter of the brain; and these are so closely associated together, that any one of them when impressed alone, shall be able to excite the mind the ideas of all the rest. Thus we derive the ideas of natural bodies from the association of the several sensible qualities with the words that express them, and with each other. The sight of part of a large building suggests the whole of the rest instantaneously, by a synchronous association of the parts; and the sound of the words which begin a familiar sentence, brings to our remembrance the remaining parts, in order, by successive association. Dr Hartley maintains, that simple ideas run into complex ones by association; and apprehends, that by pursuing and perfecting this doctrine, we may some time or other be enabled to analyse those complex ideas, that are commonly called the *ideas of reflection*, or *intellectual ideas*, into their several component parts, into the simple ideas of sensation of which they consist; and that this doctrine may be of considerable use in the art of logic, and in explaining the various phenomena of the human mind.

ASSOCIATION OF PARLIAMENT. In the 11th year of king William III. the parliament entered into a solemn association to defend his majesty's person and government against all plots and conspiracies; and all persons bearing offices civil or military, were enjoined to subscribe the association to stand by king William, on pain of forfeitures and penalties, &c. by stat. 7 and 8 W. III.

ASSODES, in medicine, a continued fever wherein the surface is moderately warm, but the internal heat great.

ASSOILE, in our ancient law books, signifies to absolve from an excommunication.

ASSOILZIE, *v. a.* in Scots law, to absolve from free.

(1.) * ASSONANCE. *n. f.* [*assonance*, Fr.] Resemblance of one sound to another resembling it. Resemblance of sound. *DiB.*

(2.) ASSONANCE, in rhetoric and poetry, a term used where the words of a phrase or a verse have the same sound or termination, and yet make no proper rhyme. These are usually accounted trifling in English; though the Romans sometimes used them with elegance: as, *Militem comparavit, exercitum ordinavit, acim lustravit.*

(1.) * ASSONANT. *adj.* [*assonant*, French.] Resounding in a manner resembling another sound. *DiB.*

(2.) ASSONANT RHYMES, is a term particular-

ly applied to a kind of verses common among the Spaniards, where a resemblance of sound serves instead of a natural rhyme. Thus, *ligera, cubierta, tierra, mesa*, may answer each other in a kind of *assonant* rhyme, having each an *e* in the penultimate syllable, and an *a* in the last.

* To ASSORT. *v. a.* [*assortir*, Fr.] To range in classes, as one thing suits with another.

* ASSORTMENT. *n. f.* [from *assort*.] 1. The act of classing or ranging. 2. A mass or quantity properly selected and ranged.

ASSOS, a sea port of Natolia, subject to the Turks, on a bay of the Ægean Sea, 12 miles S. E. of Troas. Long. 26. 36. E. Lat. 39. 32. N.

* To ASSOT. *v. a.* [from *sot*; *assorter*, Fr.] To infatuate; to besot: a word out of use—

But whence they sprung, or how they were begot,

Uncouth is to assure, uncouth to weene

That monstrous error which doth some *assot*.
Spenser.

To ASSOYL. See To ASSOILE.

ASSRUMINA, in botany, the name given by the people of Guinea to the shrub whose leaves they use as a cure for the long worms, which are found in their flesh in those parts of the world; they only bruise the leaves, and apply a large lump of the mass to the part where the worm is, and they are eased at once, without the pain and hazard of drawing it out.

(1.) * To ASSUAGE. *v. a.* [The derivation of this word is uncertain; *Minshew* deduces it from *adsuadere*, or *assuaviare*; *Junius*, from *suares*, sweet; from whence *Skinner* imagines *aswesam* might have been formed.] 1. To mitigate; to soften; to allay.—

Refreshing winds the summer's heat *assuage*,
And kindly warmth disarms the winter's rage.

Addison.

2. To appease; to pacify.—

Yet is his hate, his rancour ne'er the less,
Since nought *assuageth* malice when 'tis told.

Fairfax.

—This was necessary for the securing the people from their fears, capable of being *assuaged* by no other means. *Clarendon.*—

Shall I, t' *assuage*

Their brutal rage,

The regal stem destroy? *Dryden's Albion.*

3. To ease; as, the medicine *assuages* pain.

(2.) * To ASSUAGE. *v. n.* To abate.—God made a wind to pass over the earth, and the waters *assuaged*. *Gen. viii. 1.*

* ASSUAGEMENT. *n. f.* [from *assuage*.] Mitigation; abatement of evil.—

Tell me, when shall these weary woes have end,

Or shall their ruthless torment never cease?

But all my days in pining languor spend,
Without hope of *assuagement* or release.

Spenser's Sonnets.

* ASSUAGER. *n. f.* [from *assuage*.] One who pacifies or appeases.

ASSUAN. See SYENE.

* ASSUASIVE. *adj.* [from *assuage*.] Softening; mitigating.—

If in the breast tumultuous joys arise,

Musick,

Musick her soft *assuasive* voice applies.

Pope's St Cecilia.

* *To ASSUBJUGATE. v. a. [subjugo, Lat.]*
To subject to; not in use.—

This valiant lord

Must not so state his palm, nobly acquir'd;

Nor by my will *assubjugate* his merit,

By going to Achilles.

Shakespeare.

* *ASSUEFACTION. n. f. [assuefacio, Lat.]*

The state of being accustomed to any thing.—
Right and left, as parts inservient unto the motive faculty, are differenced by degrees from use and *assuefaction*, or according whereto the one grows stronger. *Brown's Vulgar Errours.*

* *ASSUETUDE. n. f. [assuetudo, Lat.]* Accustomance; custom; habit.—We see that *assuetude* of things hurtful, doth make them lose the force to hurt. *Bacon's Natural History.*

(1.) * *To ASSUME. v. a. [assumo, Lat.]* 1. To take.—

This when the various God had urg'd in vain,

He strait *assum'd* his native form again. *Pope.*

2. To take upon one's self.—

With ravish'd ears,

The monarch hears,

Assumes the God,

Affects to nod,

And seems to shake the spheres. *Dryden.*

3. To arrogate; to claim or seize unjustly. 4.

To suppose something granted without proof.—In every hypothesis, something is allowed to be *assumed*. *Boyle* 5. To apply to one's own use; to appropriate.—His majesty might well *assume* the complaint and expression of king David. *Clarendon.*

(2.) * *To ASSUME. v. n.* To be arrogant; to claim more than is due.

* *ASSUMER. n. f. [from assume.]* An arrogant man; a man who claims more than his due.—Can man be wise in any course, in which he is not safe too? But can these high *assumers* and pretenders to reason, prove themselves so? *South.*

* *ASSUMING. participial adj. [from assume.]*
Arrogant; haughty.—

His haughty looks, and his *assuming* air,

The son of Isis could no longer bear. *Dryden.*

—This makes him over-forward in business, *assuming* in conversation, and peremptory in answers. *Collier.*

(1.) * *ASSUMPSIT. n. f. [assumo, Lat.]* A voluntary promise made by word, whereby a man taketh upon him to perform or pay any thing to another: It contains any verbal promise made upon consideration. *Cowell.*

(2.) *ASSUMPSIT*, in the law of England, or promise, is of the nature of a verbal covenant, and wants nothing but the solemnity of writing and sealing to make it absolutely the same. If therefore, it be to do any explicit act, it is an express contract, as much as any covenant: and the breach of it is an equal injury. The remedy indeed is not exactly the same: since, instead of an action of covenant, there only lies an action upon the case, for what is called an *assumpsit* or undertaking of the defendant; the failure of performing which, is the wrong or injury done to the plaintiff, the damages whereof a jury are to estimate and settle. As, if a builder promises, undertakes, or assumes to Caius, that he will build

and cover his house within a time limited, and fails to do it; Caius has an action on the case against the builder for this breach of his express promise, undertaking, or assumpsit; and shall recover a pecuniary satisfaction for the injury sustained by such delay. So also in the case of a debt by simple contract, if the debtor promises to pay it and does not, this breach of promise entitles the creditor to his action on the case, instead of being driven to an action of debt. Thus likewise a promissory note, or note of hand not under seal, to pay money at a day certain, is an express assumpsit; and the payee at common law, or by custom and act of parliament the indorsee, may recover the value of the note in damages, if it remains unpaid. Some agreements indeed, though never so expressly made, are deemed of so important a nature, that they ought not to rest in verbal promise only, which cannot be proved but by the memory (which sometimes will induce the perjury) of witnesses. To prevent which, the statute of frauds and perjury, 29 Car. II. c. 3. enacts, that in the five following cases, no verbal promise shall be sufficient to ground an action upon, but at the least some note or memorandum of it shall be made in writing, and signed by the party to be charged therewith: 1. Where an executor or administrator promises to answer damages out of his own estate. 2. Where a man undertakes to answer for the debt, default, or miscarriage, of another. 3. Where any agreement is made upon consideration of marriage. 4. Where any contract or sale is made of lands, tenements, or hereditaments, or any interest therein. 5. And lastly, where there is any agreement that is not to be performed within a year from the making thereof. In all these cases, a mere verbal assumpsit is void.

(3.) *ASSUMPSIT, IMPLIED, CASES OF.* From the above express contracts, the transition is easy to those that are only implied by law: Which are such as justice and reason dictate, and which therefore the law presumes that every man has contracted to perform; and, upon this presumption, makes him answerable to such persons as suffer by his non-performance. Thus, I. If I employ a person to transact any business for me, or perform any work, the law implies, that I have undertaken, or assumed, to pay him so much as his labour deserved: and if I neglect to make him so much, he has a remedy for this injury, by bringing his action on the case, upon this implied assumpsit; wherein he is at liberty to suggest that I promised to pay him so much as he reasonably deserved, and then to aver, that his trouble was really worth such a particular sum, which the defendant has omitted to pay. But this valuation of his trouble is submitted to the determination of a jury; who will assess such a sum in damages as they think he really merited. This is called an *assumpsit* on a *quantum meruit*. II. There is an implied assumpsit on a *quantum valebat*, which is very similar to the former; being only where one takes up goods or wares of a tradesman, without expressly agreeing for the price. There the law concludes, that both parties did intentionally agree that the real value of the goods should be paid; and an action on the case may be brought

accord-

Accordingly, if the vendee refuses to pay that value. III. A third species of implied assumpsit is, when one has had and received money, belonging to another, without any valuable consideration, given on the receiver's part: for the law construes this to be money had and received, for the use of the owner only; and implies, that the person so receiving, promised and undertook to account for it to the true proprietor. And, if he unjustly retains it, an action on the case lies against him for the breach of such implied promise and undertaking; and he will be made to repair the owner in damages, equivalent to what he has sustained in such violation of his promise. This is a very extensive and beneficial remedy, applicable to almost every case where the defendant has received money which *ex aquo et bono* he ought to refund. It lies for money paid by mistake, or on consideration which happens to fail, or through imposition, extortion, or oppression, or where undue advantage is taken of the plaintiff's situation. IV. Where a person has laid out and expended his money for the use of another, at his request, the law implies a promise of repayment, and an action will lie on this assumpsit. V. Upon a stated account between two merchants, or other persons, the law implies that he against whom the balance appears, has engaged to pay it to the other; though there be not any actual promise. And from this implication, it is frequent for actions on the case to be brought, declaring that the plaintiff and defendant had settled their accounts together, *in simul computassent*, (which gives name to this species of assumpsit); and that the defendant engaged to pay the plaintiff the balance, but has since neglected to do it. But if no account has been made up, the legal remedy is by bringing a writ of *account de computo*; commanding the defendant to render a just account to the plaintiff, or shew the court good cause to the contrary. In this action, if the plaintiff succeeds, there are two judgments; the first is, that the defendant do account (*quod computet*) before auditors appointed by the court; and when such account is finished, then the second judgment is, that he do pay the plaintiff so much as he is found to owe. VI. The last class of contracts, implied by reason and construction of law, arises upon supposition, that every one who undertakes any office, employment, trust, or duty, contracts with those who employ or entrust him, to perform it with integrity, diligence, and skill: and by his want of either of those qualities, any injury accrues to individuals, they have therefore their remedy in damages, by a special action on the case. A few instances will fully illustrate this matter. If an officer of the public is guilty of neglect of duty, or a palpable breach of it, of non-feasance or of mis-feasance; as, if the sheriff does not execute a writ sent to him, or if he wilfully makes a false return thereof; in both these cases, the party aggrieved shall have an action on the case, for damages to be assessed by a jury. If a sheriff or gaoler suffers a prisoner who is taken upon mesne process (that is, during the pendency of a suit) to escape, he is liable to an action on the case. But if, after judgment, a gaoler or a sheriff permits a debtor to escape, who is charged

in execution for a certain sum; the debt immediately becomes his own, and he is compellable by action of *debt*, being for a sum liquidated and ascertained, to satisfy the creditor in his whole demand. An advocate or attorney that betray the cause of their client, or, being retained, neglect to appear at the trial, by which the cause miscarries, are liable to an action on the case, for a reparation to their injured client. There is also in law always an implied contract with a common inn-keeper, to secure his guest's goods in his inn; with a common carrier or barge-master, to be answerable for the goods he carries; with a common farrier, that he shoes a horse well, without laming him; with a common taylor, or other workman, that he performs his business in a workman-like manner: in which, if they fail, an action on the case lies to recover damages for such breach of their general undertaking. Also if an inn-keeper, or other victualler, hangs out a sign, and opens his house for travellers, it is an implied engagement to entertain all persons who travel that way; and upon this universal assumpsit, an action on the case will lie against him for damages, if he without good reason refuses to admit a traveller. In contracts likewise for sales, if the seller doth upon the sale warrant it to be good, the law annexes a tacit contract to this warranty, that if it be not so, he shall make compensation to the buyer: else it is an injury to good faith, for which an action on the case will lie to recover damages.

(1.) * ASSUMPTION. *n. f.* [*assumptio*, Lat.]

1. The act of taking any thing to one's self.—The personal descent of God himself, and his *assumption* of our flesh to his divinity, more familiarly to insinuate his pleasure to us, was an inforcement beyond all methods of wisdom. *Hammond's Fundamentals*. 2. The supposition, or act of supposing of any thing without farther proof.—These by way of *assumption*, under the two general propositions, are intrinsically and naturally good or bad. *Norris*. 3. The thing supposed; a postulate.

Hold, says the Stoick, your *assumption's* wrong:

I grant, true freedom you have well defin'd.

Dryden.

—For the *assumption*, that Christ did such miraculous and supernatural works, to confirm what he said, we need only repeat the message sent by him to John the Baptist. *South*. 4. The taking up any person into heaven, which is supposed by the Romish church of the Blessed Virgin.—Upon the feast of the *assumption* of the Blessed Virgin, the pope and cardinals keep the vespers. *Stillingfleet*. —Adam, after a certain period of years, would have been rewarded with an *assumption* to eternal felicity. *Wake*.

(2.) ASSUMPTION, a festival in the Romish church, in honour of the miraculous ascent of the Virgin Mary into heaven: the Greek church, who also observe this festival, celebrate it on the 15th of August with great ceremony. By such multiplications of false miracles, these churches have thrown a small degree of discredit on the true ones.

(3.) ASSUMPTION, an island of North America, in the gulph of St Laurence, at the mouth of

the river. It is covered with trees. Long. 60. 40. W. Lat. 49. 30. N.

(4.) ASSUMPTION, a large and populous town of S. America, in Paraguay, seated on the river. It is a bishop's see, and is seated in a country fertile in corn and fruits, whose trees are always green. There is likewise a quantity of pasture, and the air is temperate and salutary. Long. 57. 40. W. Lat. 34. 10. S.

(5.) ASSUMPTION, in logic, is the minor or second proposition in a categorical syllogism. It is also used for a consequence drawn from the propositions whereof an argument is composed.

(1.) * ASSUMPTIVE. *adj.* [*assumptivus*, Lat.] That is assumed.

(2.) ASSUMPTIVE ARMS, in heraldry, are such as a person has a right to assume, with the approbation of his sovereign, and of the heralds: thus, if a person, who has no right by blood, and has no coat of arms, shall captivate, in any lawful war, any gentleman, nobleman, or prince, he is, in that case, intitled to bear the shield of that prisoner, and enjoy it to him and his heirs for ever.

* ASSURANCE. *n. s.* [*assurance*, Fr.] 1. Certain expectation.—Though hope be, indeed, a lower and lesser thing than *assurance*, yet, as to all the purposes of a pious life, it may prove useful. *South.*—What encouragement can be given to goodness, beyond the hopes of heaven, and the *assurance* of an endless felicity? *Tillotson.* 2. Secure confidence; trust.—

What man is he, that boasts of fleshly might,
And vain *assurance* of mortality,
Which all so soon as it doth come to fight
Against spiritual foes, yields by and by.

Fairy Queen.

3. Freedom from doubt; certain knowledge.—Proof from the authority of man's judgment, is not able to work that *assurance*, which doth grow by a stronger proof. *Hooker.*—

'Tis far off,

And rather like a dream, than an *assurance*
That my remembrance warrants. *Shak. Tempest.*

—The obedient, and the man of practice, shall outgrow all their doubts and ignorances, till persuasion pass into knowledge, and knowledge advance into *assurance*. *South.*—Hath he found, in an evil course, that comfortable *assurance* of God's favour, and good hopes of his future condition, which a religious life would have given him? *Tillotson.* 4. Firmness; undoubting steadiness.—Men whose consideration will relieve our modesty, and give us courage and *assurance* in the duties of our profession. *Rogers.* 5. Confidence; want of modesty; exemption from awe or fear.—My behaviour ill governed, gave you the first comfort; my affection ill hid, hath given you this last *assurance*. *Sidney.* 6. Freedom from vicious shame—

Conversation, when they come into the world, will add to their knowledge and *assurance*. *Locke.* 7. Ground of confidence; security given.—The nature of desire itself is no easier to receive belief, than it is hard to ground belief; for as desire is glad to embrace the first shew of comfort, so is desire desirous of perfect *assurance*. *Sidney.*—As the conquest was but slight and superficial, so the pope's donation to the Irish submissions were but weak and fickle *assurances*. *Davies on Ireland.*—

None of woman born

Shall harm Macbeth.—

—Then live, Macduff, what need I fear of thee?
But yet I'll make *assurance* double sure,
And take a bond of fate; Thou shalt not live.

Shakespeare.

I must confess your offer is the best:
And, let your father make her the *assurance*,
She is your own, else you must pardon me,
If you should die before him, where's her dowry?

Shakespeare.

—An *assurance* being passed through for a competent fine, hath come back again by reason of some oversight. *Bacon.* 8. Spirit; intrepidity.—They like resolute men, stood in the face of the battle with more *assurance* than the wall itself. *Kn...*

With all th' *assurance* innocence can bring,
Fearless without, because secure within;
Arm'd with my courage, unconcern'd I see
This pomp, a shame to you, a pride to me.

D...

9. Sanguineness; readiness to hope.—This is not the grace of hope, but a good natural *assurance* or confidence, which Aristotle observes young men to be full of, and old men not so inclined to. *Hammond.* 10. Testimony of credit.—

I am a gentleman of blood and breeding,
And from some knowledge and *assurance* of yours
Offer this office. *Shakespeare's King Lear.*

—We have as great *assurance* that there is a God, as we could expect to have, supposing that we were. *Tillotson.* 11. Conviction.—Such an *assurance* of things as will make men careful to avoid a lesser danger, ought to awaken men to avoid a greater. *Tillotson.* 12. [In theology.] Security with respect to a future state; certainty of acceptance with God. 13. The same with *insurance*. See INSURANCE.

* To ASSURE. *v. a.* [*assurer*, Fr. from *assure*, rare, low Lat.] 1. To give confidence by a promise.—So when he had *assured* them with many words, that he would restore them without delay according to the agreement, they let him go for the saving of their brethren. 2 *Macc. xii.* 2. To secure to another; to make firm.—So irreligion and an authority cannot be reflected on, without the most awful reverence, even by those whose prayers *assure* its favour to them. *Rogers.* 3. To make confident; to exempt from doubt or fear; to confer security.—And hereby we know, that we are of the truth, and shall *assure* our hearts before him. 1 *John, iii. 19.*—

I revive

At this last fight; *assured* that man shall live
With all the creatures, and their seed posterity.

M...

4. To make secure: with *of*.—
But what on earth can long abide in state?
Or who can him *assure* of happy days? *Shak.*

And, for that dowry, I'll *assure* her *of*
Her widowhood, be it that she survives me,
In all my lands and leases whatsoever. *Shak.*

5. To affianse; to betroth.—This divine claim to me, called me Dromio, swore I was *assured* to her. *Shakef. Comedy of Errors.*

* ASSURED. *participial adj.* [from *assure*] 1. Certain; indubitable; not doubted.—It is an *assured* experience, that flint laid about the hearth

Shak.

of a tree makes it prosper. *Bacon's Nat. Hist.*
Certain; not doubting.—

Young princes, close your hands,
—And your lips too; for, I am well *assured*,
That I did so, when I was first *assur'd*.
Shak. King John.

As when by night the glaze
Of Galilee, less *assur'd*, observes
Imagin'd lands, and regions, in the moon.
Milton.

Immodest; viciously confident.
* **ASSUREDLY.** *adv.* [from *assured*.] Certain;
indubitably.—

They promis'd me eternal happiness,
And brought me garlands, Griffith, which I feel
I am not worthy yet to wear: I shall *assuredly*.
Shak. sp.

God is absolutely good, and so, *assuredly*, the
use of all that is good; but, of any thing that
evil, he is no cause at all. *Raleigh's Hist. of the*
world.—*Assuredly* he will stop our liberty, till we
have lost his worship. *South.*

* **ASSUREDNESS.** *n. s.* [from *assured*.] The
state of being assured; certainty.

* **ASSURER.** *n. s.* [from *assure*.] 1. He that
gives assurance. 2. He that gives security to make
good any loss.

ASSURGENT LEAVES, in botany, denotes
leaves which are first bent down, and then rise erect to-
wards the apex.

ASSUROR, a merchant, or other person, who
takes out a policy of assurance, and thereby in-
sures a ship, house, or the like.

ASSURRANI, or } a branch of Donatists in the
ASSURRITANI, } middle of the 4th century,
who maintained the Son to be inferior to the Fa-
ther; rebaptized their converts from the catholics,
and asserted that the church is not composed of
good and bad, but of the good alone!

ASSUS, or **Assos**, in ancient geography, a
town of Troas, though by others supposed to be
in Mysia, and the same with Apollonia; but dif-
ferent from the Apollonia on the Rhynacus.
Ptolemy places it on the sea-coast, but Strabo
says it is inland. It was the country of Cleanthes the
Stoic philosopher, who succeeded Zeno. St Luke
and others of St Paul's companions in his voyage
(Acts xx. 13, 14.) went by sea from Troas to
Assos: but St Paul went thither by land, and
meeting them at Assos, they all went together to
Mitylene. It is still called *Assos*. See **Assos**.

* **To ASSWAGE.** See **ASSUAGE**.

ASSYLUM, a town of the United States, in
Berne county, Pennsylvania, lately laid out on
the S. W. side of the E. branch of the Susquehan-
na, 14 miles above Wilksbarre. It contains about
1000 houses, all inhabited by Frenchmen.

ASSYNT. See **ASSINT**.

(1.) **ASSYRIA**, an ancient kingdom of Asia,
concerning the extent, commencement, and du-
ration of which, historians differ greatly in their
accounts. Several ancient writers, in particular
Herodotus and Diodorus Siculus, have affirmed, that
the Assyrian monarchy, under Ninus and Semira-
mis, comprehended the greater part of the known
world. Had this been the case, it is not likely
that Homer and Herodotus would have omitted a
detail so remarkable. The sacred records intimate,

that none of the ancient states or kingdoms were
of considerable extent; for neither Chedorlaomer,
nor any of the neighbouring princes, were tribu-
tary or subject to Assyria; and we find nothing of
the greatness or power of this kingdom in the his-
tory of the Judges and succeeding kings of Israel,
though the latter kingdom was oppressed and en-
slaved by many different powers in that period.
It is highly probable, therefore, that Assyria was
originally of small extent. According to Ptolemy,
it was bounded on the N. by Armenia Major; on
the W. by the Tigris; on the S. by Susiana; and
on the E. by Media.

(2.) **ASSYRIA, HISTORY OF.** The origin and
revolutions of the Assyrian monarchy were as fol-
lows.—The founder of it was Ashur, the second
son of Shem, who went out of Shinar, either by
the appointment of Nimrod, or to elude the fury
of that tyrant; conducted a large body of adven-
turers into Assyria, and laid the foundation of Ni-
neveh. *Gen. x. 11.* These events happened not
long after Nimrod had established the Chaldean
monarchy, and fixed his residence at Babylon.
The Persian historians suppose that the kings of
Persia of the first dynasty were the same with the
kings of Assyria, of whom Zohah, or Nimrod,
was the founder of Babel. (*Herbeiot Orient. Bibl. v.*
Bagdad.) It does not, however, appear, that Nim-
rod reigned in Assyria. The kingdoms of Baby-
lon and Assyria were originally distinct and sepa-
rate; (*Micah v. 6.*) and in this state they remain-
ed until Ninus conquered Babylon, and made it
tributary to the Assyrian empire. Ninus, the suc-
cessor of Ashur, (*Gen. x. 11. Diod. Sic. lib. 1.*)
seized on Chaldæa, after the death of Nimrod,
and united the kingdoms of Assyria and Babylon.
This prince is said to have subdued Asia, Persia,
Media, Egypt, &c. If he did so, the effects of
his conquests were of no duration; for, in the
days of Abraham, we do not find that any of the
neighbouring kingdoms were subject to Assyria.
He was succeeded by Semiramis; a princess of an
heroic mind; bold, enterprising, fortunate; but
of whom many fabulous things have been record-
ed. It appears, however, that there were two
princesses of the same name, who flourished at
very different periods. One of them was the
consort of Ninus; and the other lived five gene-
rations before Nitocris queen of Nebuchadnezzar.
(*Euseb. Chron. p. 58. Herod. lib. i. cap. 184.*) This
fact has not been attended to by many writers.
Whether there was an uninterrupted series of
kings from Ninus to Sardanapalus, or not, is still
a question. Some suspicion has arisen, that the
list which Ctesias has given of the Assyrian kings
is not genuine; for many names in it are of Per-
sian, Egyptian, and Grecian extraction. Nothing
memorable has been recorded concerning the suc-
cessors of Ninus and Semiramis. Of that effemi-
nate race of princes it is barely said, that they as-
cended the throne, lived in indolence, and died in
their palace at Nineveh. Diodorus relates, that,
in the reign of Teutames, the Assyrians, solicited
by Priam their vassal, sent to the Trojans a supply
of 20,000 foot and 200 chariots, under the com-
mand of Memnon, son of Tithonus, president of
Persia. But this is not confirmed by any other
author. Sardanapalus was the last, and by all
accounts

accounts the most effeminate, of these ancient Assyrian kings. Historians have unanimously reprobated his character. We by no means wish to defend it, but we cannot help remarking, that most of those princes, upon whom they have bestowed the epithet of *Great*, are much worse characters than Sardanapalus. The indolent and effeminate prince, who devotes his whole time to his pleasures, is at least a *harmless animal*, compared with the ambitious monster, who sacrifices millions of his fellow mortals to his glory or his avarice. And perhaps, had historians, instead of celebrating as *heroism*, the murders and robberies committed by those scourges of the human race, recorded their victories with the detestation they deserved, mankind might have been blessed with more Sardanapali, and cursed with fewer Nebuchadnezzars, Alexanders, and Cæsars. But leaving similar remarks to the reader's philanthropy, we have only to add that Arbaces, governor of Media, taking advantage of Sardanapalus's indolence, withdrew his allegiance, and rebelled against him. He was encouraged in this revolt by the advice and assistance of Belesis, a Chaldean priest, who engaged the Babylonians to follow the example of the Medes. These powerful provinces, aided by the Persians and other allies, who despised the effeminacy, or dreaded the tyranny of their Assyrian lords, attacked the empire on all sides. Their most vigorous efforts were, in the beginning, unsuccessful. Firm and determined, however, in their opposition, they at length prevailed, defeated the Assyrian army, besieged Sardanapalus in his capital, which they demolished, and became masters of the empire, A. A. C. 821. After the death of Sardanapalus, the Assyrian empire was divided into three kingdoms, viz. the Median, Assyrian, and Babylonian. Arbaces retained the supreme power and authority, and fixed his residence at Ecbatana in Media. He nominated governors in Assyria and Babylon, who were honoured with the title of *kings*, while they remained subject and tributary to the Median monarchs. Belesis received the government of Babylon as the reward of his services; and Phul was entrusted with that of Assyria. The Assyrian governor gradually enlarged the boundaries of his kingdom, and was succeeded by Tiglath-pileser, Salmanasar, and Sennacherib, who asserted and maintained their independency. After the death of Esar-haddon, the brother and successor of Sennacherib, the kingdom of Assyria was split, and annexed to the kingdoms of Media and Babylon. Several tributary princes afterwards reigned in Nineveh; but no particular account of them is found in the annals of ancient nations. We hear no more of the kings of Assyria, but of those of Babylon. Cyaxares king of Media, assisted Nebuchadnezzar king of Babylon, in the siege of Nineveh, which they took and destroyed, A. A. C. 606.

(3.) ASSYRIA, PRESENT STATE OF: This ancient empire is now almost entirely subject, either to the Turks or Persians; being divided into three provinces, now called CURDISTAN, DIARBEC, the ancient Mesopotamia, and IRAK ARABIC, the ancient Chaldaea. For farther particulars, respecting its modern state, see these articles.

ASSYRIAN LETTERS, a denomination given

by several Rabbins, and Talmudists, to the characters of the present Hebrew alphabet, as supposing them to have been borrowed from the Assyrians during the Jewish captivity in Babylon.

ASSYRIANS, the inhabitants of ASSYRIA. See § 2.

ASSYTHMENT. See ASSITHMENT.

(1.) ASTA, an inland town of Liguria, a Roman colony, on the river Tanarus; now called ASTI. Long. 8. 15. E. Lat. 44. 40. N.

(2.) ASTA, or ASTA REGIA, a town of Betica situated at the mouth of the Bætis, (which was choaked up with mud,) N. of Cadiz, and 12 miles distant from its port. Its ruins show its former greatness. Its name is Phœnician, denoting a *frith* or arm of the sea, on which it stood. It is said to be the same with Xata, which see.

ASTABAT, a town of Armenia, in Asia, 12 miles from the river Aras, and 12 S. of Naksur. The land about it is excellent, and produces very good wine; and a root peculiar to the country called RONAS, which dyes a beautiful red. Long. 46. 30. E. Lat. 38. 28. N.

ASTACTON, a village in Nottinghamshire near Bingham.

ASTÆUS, a species of the crab insect.

ASTAKILLOS, a denomination given by P. racellus to a malignant gangrenous ulcer in the legs, occasioned by a mercurial salt in the blood. This is also called by him *araneus*, and *ulcus araneum*, the spider's ulcer.

ASTALIN, the same with ASTANDA.

ASTANDA, in antiquity, a royal courier or messenger, the same with ANGARUS.—Darius king of Persia is said by Plutarch, in his book of the fortune of Alexander, to have formerly been an *astanda*.

ASTANTON, a village in Shropshire, near Purflow.

ASTARILÆ, } or ASTAROTHITES, a denomination given to those Jews who worshipped Astaroth.

ASTAROTH. See ASHTAROTH.

(1.) ASTARTE, in ancient geography, a city on the other side Jordan; one of the names of Rabbath Ammon, in Arabia Petrea.

(2.) ASTARTE, in Pagan mythology. See ASHTAROTH.

ASTATI, in the 9th century, the followers of one Sergius, who renewed the errors of the MONICHEES. They prevailed much under the emperor Nicephorus; but his successor, Michael Copropalates, curbed them with very severe laws.

ASTBURY, a village 2 miles from Congleton.

ASTEISM, in rhetoric, a genteel irony, or a handsome way of deriding another. Diderot places the characteristic of this figure, or species of irony, in that it is not gross and rustic, but ingenious and polite. Such, e. gr. is that of Virgil.

Qui Bavianum non odit, amet tua carmina, Marce.

ASTELL, Mary, an ornament of her sex and country, was the daughter of an opulent merchant at Newcastle upon Tyne, where she was born about 1668. She was educated in a manner suitable to her station; and amongst other accomplishments, was mistress of the French, and had some knowledge of the Latin tongue. Her uncle

a clergyman, observing in her some marks of a promising genius, took her under his tuition, and taught her mathematics, logic, and philosophy. She left the place of her nativity when she was about 20 years of age, and spent the remaining part of her life at London and at Chelsea. Here she pursued her studies with great assiduity, made great proficiency in the abovementioned sciences, and acquired a more complete knowledge of many classic authors. Among these Seneca, Epictetus, Hierocles, Antoninus, Tully, Plato, and Xenophon, were her principal favourites. Her life was spent in writing for the advancement of learning, religion, and virtue; and in the practice of those religious duties which she so zealously and pathetically recommended to others, and in which perhaps no one was ever more sincere. Her sentiments of piety, charity, humility, and other Christian graces, were uncommonly refined and sublime; and religion sat gracefully upon her, unattended with any forbidding airs of gloom.—Her mind was generally calm and serene; and her conversation was innocently facetious, and highly entertaining. She would say, “The good Christian only hath reason, and he always ought, to be cheerful; and, that dejected looks and melancholy airs were very unseemly in a Christian.” She was remarkably abstemious; and seemed to enjoy an uninterrupted state of health till a few years before her death, when, having one of her teeth cut off, it so much impaired her constitution, that she did not long survive it. This painful operation she underwent without discovering the least timidity, or so much as uttering a groan; and showed the same resolution and resignation during her whole illness. When she was confined to her bed by a gradual decay, and the time of her dissolution drew near, she ordered herroud and coffin to be made and brought to her bedside, to keep her mind fixed on proper contemplation. She died in 1731, aged 63 and was buried at Chelsea. She wrote, 1. A Serious Proposal to the Ladies. 2. An Essay in Defence of the Female Sex. 3. Letters concerning the Love of God. 4. Essays upon Marriage, Crosses in Love, and Friendship. 5. Moderation truly stated. 6 The Christian Religion, as professed by a daughter of the Church of England. 7. Bartley Fair, or an inquiry after wit; and some other works.

ASTENA, a genus of worms of the molusca order, in the Linnæan system.

(1.) **ASTER**, in ancient pharmacy, a kind of medicine, invented by Andromachus, against delusions, and divers pains.

(2.) **ASTER**, in botany, **STARWORT**: A genus of the polygamia superflua order, belonging to the syngenesia class of plants; and in the natural method ranking under the 49th order, *Compositæ liscoides*. The receptacle is naked; the pappus is simple; the rays of the corolla are 10; and the calyx is imbricated. There are above 30 species. All of them may be raised from seed sown either in autumn or spring: but the greatest part of them being perennial plants, and increasing greatly at the roots, are generally propagated by parting their roots early in the spring, and they will grow in almost any soil or situation; and the larger sorts

increase so fast, that, if not prevented, they will in a little time run over a large space of ground. They grow best in the shade: the lower kinds do not run so much at the root, but should be taken up and transplanted every other year; which will make them produce much fairer flowers.—Some few sorts, which are natives of warm climates, will require artificial heat to raise them, if not to preserve them.

(3.) **ASTER**, in mineralogy, a species of Samojed earth.

(4.) **ASTER**, in zoology. See **ASTERIAS**.

(1.) **ASTERABAD**, a province in the N. E. part of Persia, having Tabristan on the W. part of the Caspian Sea and part of Jorjan on the N. Khorasan on the E. and Koumas on the S. It is a mountainous country, except near the banks of the rivers that almost surround it, where it is pleasant and fruitful, producing grapes of a prodigious size. In other parts the soil is sandy and barren.

(2.) **ASTERABAD**, or **ASTRABAD**, the chief town of the above province, which gives name to a gulph in the Persian Sea, at the bottom of which it stands; 200 miles N. of Isfahan. Long. 54. 35. E. Lat. 37. 36. N.

ASTERAC, or **ESTERAC**, a ci-devant district of France, in Armagnac, now included in the department of Gers. It is fertile and populous.

ASTERBY, a village in Lincolnshire, 3 miles E. of Ranby.

ASTERBEY, a village in Shropshire, 4 miles S. W. of Westbury.

(1.) **ASTERIA**, a gem, usually called the *cat's eye*, or *oculis cati*. It is a very singular and very beautiful stone, and somewhat approaches to the nature of the opal, in having a bright included colour, which seems to be lodged deep in the body of the stone, and shifts about, as it is moved, in various directions: but it differs from the opal in all other particulars, especially in its want of the great variety of colours seen in that gem, and in its superior hardness. It is usually found between the size of a pea and the breadth of a sixpence; is almost always of a semicircular form, broad and flat at the bottom, and rounded and convex at the top; and is naturally smooth and polished. It has only 2 colours, a pale brown and a white; the brown seeming the ground, and the white playing about in it, as the fire colour in the opal. It is considerably hard, and will take a fine polish, but is usually worn with its native shape and smoothness. It is found in the E. and W. Indies, and in Europe. The island of Borneo affords some very fine ones, but they are usually small; they are very common in the sands of rivers in New Spain; and in Bohemia they are often found immersed in the same masses of jasper with the opal.

(2.) **ASTERIA**, an extraneous fossil, called in English the **STAR-STONE**. These fossils are small, short, angular, or sulcated columns, between one and two inches long, and seldom above a third of an inch in diameter: composed of several regular joints; when separated, each resembles a radiated star. They are, not without reason, supposed to be a part of some sea fish petrified, probably the *asterias*

asteris or *sea-star*. The *asteris* is also called *asterias*, *astroites*, and *asteriscus*. They may be reduced to two kinds: those whose whole bodies make the form of a star; and those which in the whole are irregular, but are adorned as it were with configurations in the parts. Dr Lister, for distinction's sake, only gives the name *asteris* to the former sort, distinguishing the latter by the appellation of *astroites*; other naturalists generally use the two indiscriminately. The *asteris* spoken of by the ancients appears to be of this latter kind. The quality of moving in virogor, as if animated, is scarce perceivable in the *astroites*, but is signal in the *asteris*. The former must be broken in small pieces before it will move, but the latter will move, not only in a whole joint, but into two or 3 part together. The curious frequently meet with these stones in many parts of England: at Clevedon in Oxfordshire they are found rather larger than common, but of a sifter substance, for on being left a small space of time in a strong acid, they may easily be separated at the joints in small plates.

(1.) *ASTERIA*, in zoology, a name by which some authors have called the false *galeasmaris*, or *galeasmaris*. See FALCO.

(2.) *ASTERIAS*, STAR-FISH, or SEA STAR, in zoology, a genus of insects of the order of vermes mollusca. It has a depressed body, covered with a coriaceous coat, is composed of five or more segments, running out from a central part, and furnished with numerous tentacula; and has the mouth in the centre.—The conformation of the mouth is this. The under part of each lobe moves towards a point with the rest at the centre of the body; and their several productions of the rays make a sort of lips, the ends of each of which are armed with a number of sharp teeth, which serve to take and convey the food into the body. From this mouth there goes a separate canal to all or many of the rays, which runs through their whole length, and becomes gradually narrower as it approaches the extremity. The tentacula resemble the horns of fishes, but serve the animal to walk with. They are capable of being contracted or shortened, and it is only at the creatures moving that they are seen of their full length, at other times, no part of them is seen but the extremity of each, which is formed like a foot of button, being somewhat larger than the rest of the horn. Aristotle and Pliny called this genus *aree*, and *stellæ maris*, from their resemblance to the pictured form of the stars of heaven, and they asserted that they were so exceedingly hot, as instantly to consume whatsoever they touched! The fable would have been greatly enriched by the fragments and remains of the several pieces of star-fish which have been converted into stones. See ASTERIS. No. 2.

There are many species of this genus. Some of 24, 13, and even 12 rays. Most of them are found in our seas. See PL. XIII. fig. 6, 11, 12, and 13.

1. *ASTERIAS CAPUT MEDUSÆ*, or arbutuscent sea-star, has 5 rays issuing from an angular body; the rays dividing into innumerable branches, growing flender as they recede from the base. The animal, in swimming, spreads like a net to their full length, and when he perceives any prey within them, draws them in again, thus catching

it with all the dexterity of a fisherman. It was an inhabitant of every sea; and is called by some the MACELLANIC STAR-FISH, and *asteriscus*. When it extends its rays fully, it forms a circle of near 3 feet in diameter. The fragments of the rays furnish the fossil entrochi. It is drawn by animal in brandy or spirits of wine, and kept in rays flat and expanded in the vacuum, a method to extract by means of a pair of forceps the mach of the animal whole and entire through its mouth.

2. *ASTERIAS CLATHRATA*, or emodoid sea-star, with five short thick rays, bristly bristly cancellated above, is found on our coast, and rare.

3. *ASTERIAS BRACHYRHOS* has ten very slender rays, with numbers of long bristles on the sides, the body is small, and surrounded with ten filiform rays. It inhabits the rocks of Scotland.

4. *ASTERIAS GLACIALIS*, with five rays, pressed, broad at the base, yellow, and long round fringed operculum on the back, is very common, it feeds on oysters, and a very delicate to the beds.

5. *ASTERIAS HISPIDA*, with five rays, long angulated at top, and rough with short bristles of a brown colour, and is found about the rocks.

6. *ASTERIAS OCULATA*, with five rays, dotted or punctured, as of a fine purple and is also found about Anglesea.

7. *ASTER AS PLACENTA*, with five rays, and membranaceous rays, extremely thin, is found about Weymouth.

8. *ASTERIAS SPERULATA*, with a small indented body; a small globular head at the base of each ray; the rays slender, taper, and hirsute on their sides, is found about Anglesea.

(11.) *ASTERIAS*, in ornithology, the name of the bittern. See ARDEA. No. 1.

ASTERION, in astronomy, one of the stars in the constellation.

ASTERISCUS, *asteriscus* *beginnings*, in typography, the cross.

(x) * *ASTERISK*, *n. f.* (*astēriskos*) a printing or writing, in form of a little star.

He also published the translation of the Septuagint by itself, having first compared it with the Hebrew, and noted by *asterisks* what was added, and by obelisks what was redundant.

(x) *ASTERISKS* are used in the work to distinguish the articles taken from *Johnson's Dictionary*; an allusion being made to each, as in last and next articles.

* *ASTERISM*, *n. f.* (*astērismos*) a little star. Bellarmine.—Poetry had filled the stars with signs, and authorities belonging to them, and astrology devices the feigned virtues and influences of each. *Bentley's Sermons*. 2. An obelisk mark. This is a very improper use.—Particularly no passages with an *asterisk* as observations which follow such a note, do you a clear light. *Dryden's Preface*.

ASTERISK, *n. f.* (*astēriskos*) a little star who lived about A. D. 449. He wrote a treatise on the Old and New Testament, and

se, which is extant, and in which each strophe contains, in the first verse, an historical fact in the Old Testament; and in the 2d an application of that fact to some point in the New.

(1.) * **ASTERN**. *a. s.* [from *a* and *stern*.] In the hinder part of the ship; behind the ship.—

The galley gives her side, and turns her prow,
While those *astern* descending down the steep.
Thro' gaping waves behold the boiling deep.

Dryden.

(2.) **ASTERN** is also used to signify any thing some distance behind the ship; being the opposite of **AHEAD**, which signifies the space before.

See **AHEAD**, § 2.

ASTEROPÆUS, a Trojan hero, who fought with Achilles, in single combat, and proved himself invulnerable, by wounding him in the right arm; notwithstanding which Achilles slew him.

ASTEROPHYTON, in natural history, a kind of fish, composed of a great number of cylindric segments, each branching out into several others, so as to represent the branched stalks of a very intricate fungus.

ASTEROPODIUM, a kind of extraneous fossil, of the same substance with the asteriæ or starfishes, to which they serve as a base. See **ASTEROID** and **STAR STONE**.

* **To ASTERT**. *v. a.* [a word used by *Spenser*, it seems, for *start*, or *startle*.] To terrify; to frightle; to fright.—

We deem of death, as doom of ill desert;
But knew we fools what it us brings until,
Die would we daily, once it to expert;
No danger there the shepherd can *astert*. *Spens.*

ASTERY, a river in Suffex.

(1.) * **ASTHMA**. *n. s.* [*ασθμα*.] A frequent, difficult, and short respiration, joined with a hoarse sound and a cough, especially in the night; and when the body is in a prone posture; cause then the contents of the lower belly bear against the diaphragm, as to lessen the capacity of the breast, whereby the lungs have less room to move. *Quincy*.—An *asthma* is the inflation of the membranes of the lungs, and of the membranes covering the muscles of the thorax. *Floyer de Honours*.

(2.) **ASTHMA**. See **MEDICINE**, **INDEX**.

ASTHMATICAL. *a. s.* [from *asthma*.]

ASTHMATICK. } Troubled with an asthma.—In *asthmatical* persons, though the lungs be much stuffed with tough phlegm, yet the patient may live some months, if not some years. —After drinking, our horses are most *asthmatical*; and, for avoiding the watering of them, we withhold their hay. *Floyer*.

ASTHORP, a village in Lincolnshire, 2 miles north of Scampton.

(1.) **ASTI**, a city of Montferrat in Italy, capital of the county, (Nº 2.) It has a bishop's see; is fortified with strong walls and deep ditches; is divided into the city, borough, citadel, and castle. There are a great many churches, convents, and other handsome buildings in it. It is situated on the Tanaro, 15 m. S. W. of Cassel. Long. 8. 15. E. Lat. 44. 40. N.

(2.) **ASTI**, a county of Montferrat, very fertile, being well watered, and abounding with vines, pleasant hills, and spacious fields. It was

the scene of some of the late victories of the French, under Buonaparte.

ASTIER, ST, a town of France, in the department of Dordogne.

ASTIGI, in ancient geography, a colony, and conventus juridicus, of Bætica, situated on the Singulus, which falls into the Bætis; called also **COLONIA ASTIGITANA**, and **AUGUSTA FIRMA**; now **ECYA**, midway between Seville and Corduba. Long. 5. 0. W. Lat. 37. 20. N.

To ASTIPULATE. *v. a.* to covenant. *Bailey*.

ASTIPULATION. *n. s.* a mutual agreement.

ASTIPULATOR, in the Roman order, he by whose consent and leave a nun takes the religious habit.

ASTLEHAM, a village in Middlesex, between Staines and Sunbury.

(1.) **ASTLEY**, John, a native of Wem in Shropshire, though he studied painting under the same master with Sir Joshua Reynolds, is more memorable as a favourite of fortune, than as a limner. His best pictures are copies of the Bentivoglio's, Titian's Venus, &c. But although he gained several thousands by painting, he gained more by marriage, and still more by death. Lady Daniel, having sat for her picture, within a week after gave him the *original*, with the estate of Duckenfield, worth L. 5000 a year. His brother, being overrun by a waggon, left him L. 10,000. Estimating what he got by painting and by other legacies, he was worth considerably above L. 100,000. Of this he told Dr Warren, when languishing under the consequences, he had spent L. 30,000 upon 7 years' excesses; and in the self disapprobation of a retrospective hour, declared he would give the remainder to redeem the time he had lost! He died in 1787.

(2.) **ASTLEY**, the name of 5 villages, viz. of two in Lancashire, 1. near Liverpool; and 2. between Manchester and Leigh: 3. and 4. in Shropshire, near Hadnal, and 3 miles from Bridgenorth: and, 5. in Warwickshire, near Milverton.

ASTOL, a village in Oxfordshire, between Burford and Whitney.

ASTOLLY, a village in Oxfordshire, 3 miles from Whitney.

ASTOMI, in anthropology, a people feigned without mouths. Pliny speaks of a nation of Astomi in India, who lived only by the smell or effluvia of bodies taken in by the nose!

ASTON, the name of 22 English villages; viz. 1. in Berkshire, near Moulesford: 2. in Bucks, in Evingo parish: 3. in Cheshire, near Budworth: 4. in Derbyshire, in the High Peak: 5. in ditto, near Middleton Park; and, 6. near the Trent: 7. in Herefordshire, near Wigmore; and, 8. between Leominster and Luckton: 9. in Hertfordshire, near the river Beane: 10. in Oxfordshire, near Brampton: 11. in Shropshire, E. of Brampton; 12. N. W. of Bishop's castle; 13. near Newport; 14. near Oswestry; and 15. near Shefnal: 16. in Staffordshire, near Birmingham: 17 and 18. in Wiltshire, near Berwick; 19. near Everley; 20. in Wight Isle, near King's Wood: 21. in Worcester, near Campden: and, 22. in Yorkshire, 4 miles S. of Rotherham. **ASTON** also makes a part of the name of 31 other villages: viz.

1. **ASTON-ABBOTS**, in Bucks, near Aylmer.

2. ASTON-BLANK, 6 m. from Show; and 22 from Gloucester.
3. ASTON-BOTTFIELD, in Shropshire, E. of Bowntree.
4. ASTONBY, between Carlisle and Langton.
5. ASTON-CANTLOW, in Warwickshire, near Buxford.
6. ASTON-CHAPPEL, in Staffordshire, between Penkridge and Tong-Castle.
7. ASTON-CHURCH, in Shropshire, near Newport.
8. ASTON-CLINTON, in Bucks, near Wendover.
- 9-11. ASTON-COLD; 1, in Bucks, near Aylesbury; 2, in Derbyshire, near Scarcliffe; and 3, in Gloucestershire, 3 miles from Bath, and 34 from Gloucester.
12. ASTON-DEYS, in Shropshire, N. E. of Tenbury.
13. ASTON-ELANVILLE, in Leicestershire, near Epscoe.
14. ASTON-INGHAM, near Newent, Herefordshire.
15. ASTON-MAGNA, 6 miles from Pershore, Worcestershire.
16. ASTON, MIDDLE, 3 m. S. of Charwell, Oxfordshire.
17. ASTON, NORTH, opposite to Somerton, Oxfordshire.
- 18, 19. ASTON, PARVA, 1, near Stafford; and, 2, near Walsall.
20. ASTON-PICOT, 2 both in Shropshire, near 21. ASTON-SOGER, 1 Cheshire.
22. ASTON-SOWER, near Crowel, Oxfordshire.
23. ASTON-SOMERVILLE, in Gloucestershire, near Campden, 4 miles from Evesham. This village, and the adjacent fens, belong to Lord Somerville.
- 24, 25. ASTON-STEEPLE, 1, in Oxfordshire, near Heyford; and, 2, in Wiltshire, on the road from Salisbury to Bath.
26. ASTON-SURROD, in Everholme valley, Gloucestershire, two miles from Campden.
27. ASTON-TYFELL, near Abington, Berks.
28. ASTON-UNDERS-HILL, in Gloucestershire, 3 miles from Evesham.
29. ASTON-UPON-CASSAN, near Tewkesbury, in Gloucestershire.
30. ASTON, WEST, near Whorwellstown, Wiltshire.
31. ASTON-WHEATON, in Staffordshire, between Lupton, and Water Eaton.

* ASTONIED, *part. adj.* A word used in the version of the bible for *astonished*.—Many were *astonied* at thee. *Isaiah*, vi. 12.—

Unmanly dread invades
The French *astond*. *J. Phillips.*
* To ASTONISH, *v. a.* [from *astound*, Fr. from *astundus*, Lat.] To confound with some sudden passion, as with fear or wonder, to amaze; to surprise; to stun.—

It is the part of men to fear and tremble,
When the most mighty gods, by tokens, send
Such dreadful heralds to *astound* us. *Shakspeare.*
Astond'd at the voice, he stood amazed,
And all around with inward horror gas'd.

A genius universal as his theme, *Addison.*
*Astond*ing as thou. *Thomson.*
* ASTONISHINGNESS, *n. f.* [from *astound*, Fr.]
Of a nature to excite astonishment.
* ASTONISHMENT, *n. f.* [from *astound*, Fr.]

Amazement, confusion of mind from terror or wonder.—We found, with no less wonder to us, the *astoundment* to themselves, that they were the valiant and famous brothers. *Sully*.—She *astond*ed this as much above his wisdom, as *astound*ed is beyond mere admiration. *Asses.*

ASTORCHA, in botany, a name given by some botanists to the *Stroscia*.

ASTORGA, a very ancient city of Spain, in the kingdom of Leon, with a bishop's see, seated on the river Tago, and well fortified both by art and nature. It stands in a most agreeable plain about 150 miles N. W. of Madrid. *Long*, i. W. Lat. 42. 10. N.

* To ASTOUND, *v. a.* [from *astound*, Fr.] To confound; to confound with fear or wonder. The word is now somewhat obsolete.—

These thoughts may flunk well, but are *astound*.
The virtuous mind, that ever with itself
By a strong sifting champion, confound
ASTOUR, in commerce, discount. *Asiatick*.
ASTRABAD. See *ASTERABAD*, N° 1.

(1.) ASTRACAN, a province of Russia, the most easterly part of Europe, bounded on N. by Bessarabia and Baskiria; on the S. by the Caspian Sea; on the W. by the Volga, which divides it from the Nagayanz Tartars and Don Cossacks; and on the E. by the great ridge of mountains which separate it from Great Tartary. The province extends from 46° to 58° Lat. The soil is long, and intensely hot; the winter lasts about three months so severe, that the ice is frozen hard enough to bear loaded teams; the soil is rich and fertile; but the Tartars, who live there, are strangers to agriculture. On the northern and southern sides of the Volga are two prodigious extent, sandy, desert, and uncultivated; these, however, produce vast quantities of transparent salt in pits, which the Tartars use to salt their meat, and the thickness of it is on the surface of the water. There are no inhabitants in the neighbourhood of Astracan which yield the excellent salt in such abundance, that any man may carry it off, paying at the rate of one ruble a pood which is equal to 40 lbs.

(2.) ASTRACAN, the metropolis of the province, (N° 1) is situated within the bounds of Asia, on an island called *Dolga*, about 150 miles above the mouth of the Volga. The city derives its name from Hagee Tarba, a czar, by whom it was founded. It was captured by Iwan Bashowitz, recovered by the Russians in 1681, and retaken by the Cossacks, who used for this purpose a great number of flat-bottomed vessels, in which they transported the heavy cannon from Casan. It is about two miles and a half in circumference, surrounded by a wall, in a ruinous condition, but it is a very fertile and pleasant suburb, near 3 miles. The number of inhabitants amounts to 70,000, including the Russians, and a few Persians and Indians. The garrison consists of six regiments of the best troops, who, when this place was seized by the side of Persia, had in the adjacent part of the province a great number of fine fields, and obstructed the approach of the Persians. The houses of Astracan are built of mud, and

nerally mean and inconvenient. The higher parts of the city command a prospect of the Volga, which is here about three miles in breadth. The marshy lands on the banks of it render the air very sickly in summer. Astracan is a good port, for the Persian market. It lies 80 miles of the Caspian Sea and 800 S. W. of Moscow. Long. 47. 40. E. Lat. 46. 22. N. according to Walker. Others place it in Long. 52. 5. E. and Lat. 47. 10. N.

(1.) **ASTRACAN, COMMERCE OF.** Formerly the inhabitants of Astracan traded to Khiva and Khara; but at present these branches are lost, and their commerce is limited to Persia and the provinces of Russia. Even the trade to Persia is much diminished by the troubles of that country: nevertheless, the commerce of Astracan is still considerable. Some years ago, the city maintained about 40 vessels, from 100 to 200 tons burthen, for the Caspian traffic. Some of these belong to the government, and are commanded by an officer, under the direction of the admiral.

This office is generally well stocked with provisions, which are sold occasionally to the merchants. The trading ships convey provisions to the frontier towns of Terki and Kizlar, situated on the Caspian Sea; and transport merchandize to the principal parts of Persia. The merchants of Astracan export to Persia, chiefly on account of the diamonds, red leather, linens, woollen cloths, and other European manufactures. In return, they import the commodities of Persia, particularly those manufactured at Casan; such as silks, and silks intermixed with gold, for the use of the nobles; wrought silks and stuffs mixed with cotton; rice, cotton, rhubarb, and a small quantity of other drugs; but the chief commodity is raw

The government has engrossed the article of rhubarb, the greater part of which is brought from Russia by the Tartars of Yakutski, bordering on the eastern Tartars belonging to China. They bring it through Siberia to Samara, thence to Casan, and lastly to Moscow.

(2.) **ASTRACAN, PRODUCE, CLIMATE, &c. OF.** The earth of this province being impregnated with sulphur, is extremely fertile, and produces abundance of grain, the immoderate use of which is attended with periodical distempers. Sickness is likewise the consequence of those annual changes in the climate produced by the floods in spring and autumn. All round the city of Astracan, at the distance of two miles, are seen a great number of gardens, orchards, and vineyards, producing all kinds of herbs and roots. The grapes are so delicious, that they are preserved in sand, and transported to court by land-carriage at a prodigious price: yet the wine of Astracan is very indigestible. The summer being generally dry, the inhabitants water their gardens by means of large wheels worked by wind or horses, which raise the water to the highest part of the garden, from whence it runs in trenches to refresh the roots of every single tree and plant. The neighbouring country produces hares and partridges, plenty of fish in summer, with wild and water fowl of every sort in abundance. About ten miles below Astracan (See N° 1.) there is a small island called BOSMAIFE, on which are built large stores.

houses for the salt, which is made about 12 miles to the eastward, and, being brought hither in boats, is conveyed up the Volga, in order to supply the country as far as Moscow and Twere. The quantity of salt annually dug for these purposes amounts to some millions of pounds, the exclusive property of which is claimed by the crown, and yields a considerable revenue; for the soldiers and bulk of the people live almost entirely on bread and salt. The neighbourhood of these salt works is of great advantage to the fisheries, which extend from hence to the Caspian Sea, and reach S. E. as far as Yack, and even 100 miles above Zaritzen. The principal fish here caught are sturgeon and belluga. These, being salted, are put on board of vessels, and sent away in the spring, for the use of the whole empire, even as far as Petersburg: but as fish may be kept fresh as long as it is frozen, the winter is no sooner set in than they transport great quantities of it by land through all the provinces of Russia. Of the roes of the fish called *belluga*, which are white, transparent, and of an agreeable flavour, the fishers here prepare the caviare, which is in so much esteem all over Europe. These fisheries were first established by one Tikon Demedoff, a carrier, who settled in this place about 60 years ago, his whole wealth consisting of two horses. By dint of skill and industry, he soon grew the richest merchant in this country: but his success became so alluring to the crown, that of late years it hath engrossed some of the fisheries as well as the salt works. From the latter end of July to the beginning of October, the country about Astracan is frequently infested with myriads of locusts, which darken the air in their progression from N. to S. and, wherever they fall, consume the whole verdure of the earth. These insects can even live for some time under water: for when the wind blows across the Volga, vast numbers of them fall in clutters, and are rolled ashore; and their wings are no sooner dry, than they rise and take flight again.

(3.) **ASTRACAN, REVENUE, RELIGION, &c. OF.** The revenue of Astracan is computed at 150,000 rubles, or 31,000 pounds, arising chiefly from salt and fish. The city is ruled by a governor, under the check of a chancery. He is nevertheless arbitrary enough, and exercises oppression with impunity. The officers of the admiralty and custom-house having very small salaries, are open to corruption, and extremely rapacious. At christening feasts, which are attended with great intemperance, the guests drink a kind of cherry-brandy out of large goblets; and every person invited throws a present of money into the bed of the mother, who sits up with great formality to be saluted by the company. The Indians have a Pagan temple at Astracan, in which they pay their adoration, and make offerings of fruit to a very ugly deformed idol. The priests of this pagoda use incense, beads, cups and prostrations. The Tartars, on the contrary, hold idol-worship in the utmost abomination.

* **ASTRADDLE.** *adv.* [from *a* and *straddle*.] With one's legs across any thing. *Dis.*

(1.) **ASTRÆA**, in astronomy, a name which some give to the sign Virgo, by others called *Erigone*, and sometimes *Mis*.

(2.) **ASTRÆA**, in the mythology, the goddess of justice, and the daughter of Jupiter by Themis; or as others have it, by Nemesis, the goddess of vengeance. The poets feign that Astræa quitted heaven to reside on earth, in the golden age; but, growing weary of the iniquities of mankind, she left the earth, and returned to heaven, where she commenced a constellation of stars, and from her orb still looks down on the ways of men.

(1.) * **ASTRAGAL**. *n. f.* [*αστραγαλόν*, the ankle, or ankle-bone.] A little round member, in the form of a ring or bracelet, serving as an ornament at the tops and bottoms of columns. *Builder's Dict.* —We see none of that ordinary confusion, which is the result of quarter rounds of the *astragal*, and I know not how many other intermingled particulars. *Spectator*.

(2.) **ASTRAGAL**, in architecture, a little round moulding, which in the orders surrounds the top of the shaft or body of the column. It is also called the *talon* and *tondino*; it is used at the bottoms as well as the tops of columns, and on other occasions: it properly represents a ring, on whatever part of a column it is placed; and the original idea of it was that of a circle of iron put round the trunk of a tree, used to support an edifice to prevent its splitting. See Plate XX. fig. 2. The astragal is often cut into beads and berries, and is used in the ornamented entablatures to separate the several faces of the architrave. See ARCHITECTURE, INDEX.

(3.) **ASTRAGAL**, in gunnery, a round moulding encompassing a cannon, about half a foot from its mouth:

ASTRAGALOIDES, in botany, the *PHACA* of Linnæus.

ASTRAGALOMANCY, [from *αστραγαλός*, and *μαντία*, divination,] a species of divination performed by throwing small pieces, with marks corresponding to the letters of the alphabet; the accidental disposition of which formed the answer required. This kind of divination was practised in a temple of Hercules at Achaia.

ASTRAGALOTE, in natural history, a species of fossil alum, thus called, from its resembling a *talus*, or ankle-bone; whence it is also denominated *talare*.

(1.) **ASTRAGALUS**, in anatomy. See ANATOMY, § 159.

(2.) **ASTRAGALUS**, in botany, **MILK-VETCH**, or **LIQUORICE-VETCH**: A genus of the decandria order, belonging to the diadelphia class of plants; and in the natural method ranking under the 32d order, *Papilionacea*, the pod is gibbous and bilocular. Of this genus there are 39 species.

1. **ASTRAGALUS COMMUNIS**, the common species grows wild upon dry uncultivated places, and is recommended by Mr Anderson to be cultivated as proper food for cattle. See HUSBANDRY, INDEX.

2. **ASTRAGALUS TRAGACANTHA** is a thorny bush growing in Crete, Asia, and Greece, which yields the gum tragacanth. This is of so strong a body, that a dram of it will give a pint of water the consistence of a syrup, which a whole ounce of gum Arabic is scarce sufficient to do. Hence for forming troches, and the like purposes, hence to the other gums.

* **ASTRAL**. *adj.* [from *astrum*, Lat.] Stary; belonging to the stars.—

Some *astral* forms I must invoke by pray'r,
Fram'd all of purest atoms of the air;
Not in their natures simply good or ill;
But most subservient to bad spirits' will. *Dryden*.

ASTRALISH, among miners, is the ore of gold in its first state.

ASTRANTIA, **MASTERWORT**: A genus of the digynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 45th order, *Umbellata*. The involucre is lanceolated, open, equal, and coloured. The species are two,

1. **ASTRANTIA MAJOR**, } both natives of the
2. **ASTRANTIA MINOR**, } Alps, and possessing
no remarkable properties.

ASTRAPÆA, in natural history, a name given by the ancients to a stone, since called, properly, *ASTRAPIA*, and by some *ASTRAPIAS*. It was of a blue, or blackish ore, with white veiegations, running in the form of waves and clouds. Some specimens of the Persian *lapis lazuli* are of this kind, but they are rare.

ASTRAPIA, or **ASTRAPIAS**. See last article.

ASTRARII, in writers of the middle age, the same with *mansuarii*, those who live in the house, or family, at the time when a person dies.

ASTRARIUS HÆRIS, [from *astre*, old Fr. a hearth,] is used in our old writers, where the ancestor, by conveyance, hath set his heir apart, and his family, in a house, in his life-time.

* **ASTRAY**. *adv.* [from *a* and *stray*.] Out of the right way.—

May seem the wain was very evil led,
When such an one had guiding of the way,
That knew not, whether right he went, or did
astray. *Spenser*.

—You run *astray*, for whilst we talk of Ireland
you rip up the original of Scotland. *Spenser on Ireland* —

Like one that had been led *astray*
Through the heav'n's wide pathless way. *Kent*.

* **TO ASTRIC**. *v. a.* [*astringo*, Lat.] To contract by application, in opposition to *relax*: a word not so much used as *constringe*.—The parts were to be relaxed or *astried*, as they let the humours pass either in too small or too great quantities. *Arbutnot on Aliments*.

(1.) * **ASTRICTION**. *n. f.* [*astriō*, Lat.] The act or power of contracting the parts of the body by applications.—*Astriō* is in a substance that hath a virtual cold; and it worketh partly by the same means that cold doth. *Bacon*.—This vice requireth an *astriō*, but such an *astriō* is not grateful to the body; for a pleasing *astriō* doth rather bind in the nerves than expel them; and therefore such *astriō* is found in things of a harsh taste. *Bacon*.—Lenitive substances are proper for dry atrabiliarian constitutions, who are subject to *astriō* of the belly and the pila. *Arbutnot on Diet*.

(2.) **ASTRICTION**, in law. See THIRLAGE.

(3.) **ASTRICTION**, in medicine, the operation of astringent medicines.

* **ASTRICTIVE**. *adj.* [from *astriō*.] Styptic; of a binding quality. *Dict.*

* **ASTRICTORY.** *adj.* [*astriſtorius*, Lat.] A-
ingent; apt to bind. *Diſ.*

ASTRICUS LAPIS, in natural history, a kind of
ured stone, broken or cut from the *enaſtros*,
ter the ſame manner as the *trocbitæ* from the *en-*
tebi.

* **ASTRIDE.** *adv.* [from *a* and *ſtride*.] With
e legs open.—

To lay their native arms aſide,
Their modeſty, and ride *aſtride*. *Hudibras*.
I ſaw a place, where the Rhone is ſo ſtraited
tween two rocks, that a man may ſtand *aſtride*
on both at once. *Boyle*.

* **ASTRIFEROUS.** *adj.* [*aſtrifer*, Lat.] Bear-
g or having ſtars. *Diſ.*

* **ASTRIGEROUS.** *adj.* [*aſtriger*, Lat.] Carry-
g ſtars. *Diſ.*

ASTRILD, in ornithology, a ſpecies of the
OXIA.

* **To ASTRINGE.** *v. a.* [*aſtringo*, Lat.] To
els by contraction; to make the parts draw to-
ther.—Tears are cauſed by a contraction of the
irits of the brain; which contraction, by con-
quence, *aſtringeth* the moiſture of the brain, and
erely ſendeth tears into the eyes. *Bacon*.

* **ASTRINGENCY.** *n. ſ.* [from *aſtringe*.] The
wer of contracting the parts of the body; op-
poſed to the power of *relaxation*.—Aſtriction prohi-
bith diſſolution; as, in medicines, aſtringents in-
bit putrefaction: and, by *aſtringency*, ſome ſmall
ntity of oil of vitriol will keep freſh water long
om putrefying. *Bacon's Natural Hiſtory*.—Acid,
rid, auſtere, and bitter ſubſtances, by their
tringency, create horreur, that is, ſtimulate the
res. *Arbutnot*.

(1.) * **ASTRINGENT.** *adi.* [*aſtringens*, Lat.]
ading; contracting; oppoſed to *laxative*: it
uſed ſometimes of taſtes which ſeem to contract
e mouth.—*Aſtringent* medicines are binding,
hich act by the aſperity of their particles, where-
they corrugate the membranes, and make them
aw cloſer. *Quincy*.—The myrobalan hath parts
contrary natures, for it is ſweet and yet *aſtrin-*
nt. *Bacon*.—The juice is very *aſtringent*, and
erefore of ſlow motion. *Bacon's Nat. Hiſt.*—
hat diminiſheth ſenſible perſpiration, encreaſeth
e inſenſible; for that reaſon a ſtrengthening and
tringent diet often conduceth to this purpoſe.
Arbutnot on Aliments.

(2.) **ASTRINGENTS**, in the materia medica,
uſtances diſtinguiſhed by a rough, auſtere taſte,
d changing ſolutions of iron, eſpecially thoſe
ade in the vitriolic acid, into a dark purple or
ack colour; ſuch as galls, tormentil root, biſtor-
ot, balaſtinea, terra japanica, acacia, &c. See
ATERIA MEDICA.

ASTROBOLISM, [from *αστηρ*, a ſtar, and *βολω*,
ſtrike,) the ſame with *ſphacelus*; though pro-
rly applied to plants which are deſtroyed in the
g-days, as if blaſted by that ſtar.

ASTROCHITES, or **ASTROITES**. See *As-*
ERIA, No. 2.

ASTRODICTICUM, an astronomical inſtru-
ent invented by M. Weighelius, by means of
hich many perſons ſhall be able at the ſame time
behold the ſame ſtar.

ASTROGNOSIA, [from *αστηρ*, ſtar, and *γινωσκειν*,
know,) the art of knowing the fixed ſtars, their

names, ranks, ſituations in the conſtellations, and
the like. See *ASTRONOMY*.

* **ASTROGRAPHY.** *n. ſ.* [*αστρον*, and *γραφω*.] The
ſcience of deſcribing the ſtars. *Diſ.*

ASTROITES, or **STAR-STONE**. See *ASTE-*
RIA, No. 2. and **STAR-STONE**; and Plate XIII.
Fig. 14.

(1.) * **ASTROLABE.** *n. ſ.* [of *αστηρ*, and *λαβω*, to
take.] 1. An inſtrument chiefly uſed for taking
the altitude of the pole, the ſun or ſtars, at ſea.—
2. A ſtereographick projection of the circles of the
ſphere upon the plain of ſome great circle. *Chamb.*

(2.) **ASTROLABE**, among the ancients, was the
ſame as our armillary ſphere.

(3.) **ASTROLABE**, among the moderns, is uſed
for **PLANISPHERE**, or a ſtereographic projection
of the ſphere, either upon the plane of the equa-
tor, the eye being ſuppoſed to be in the pole of
the world; or upon the plane of the meridian,
when the eye is ſuppoſed in the point of the inter-
ſection of the equinoctial and horizon.

* **ASTROLOGER.** *n. ſ.* [*aſtologus*, Lat. from
αστρον and *λογω*.] 1. One that, ſuppoſing the in-
fluences of the ſtars to have a cauſal power, pro-
feſſes to foretel or diſcover events depending on
thoſe influences.—Not unlike that which *aſtolo-*
gers call a conjunction of planets, of no very be-
nign aſpect the one to the other. *Watton*.—A hap-
py genius is the gift of nature: it depends on the
influence of the ſtars, ſay the *aſtrologers*; on the
organs of the body, ſay the naturaliſts; it is the
particular gift of heaven, ſay the divines, both
chriſtians and heathens. *Dryden*.—

Aſtrologers, that future fates foreſhew. *Pope*.
—I never heard a finer ſatire againſt lawyers, than
that of *aſtrologers*, when they pretend, by rules
of art, to tell when a ſuit will end, and whether
to the advantage of the plaintiff or defendant.
Swift. 2. It was anciently uſed for one that un-
derſtood or explained the motions of the planets,
without including prediction.—A worthy *aſtolo-*
ger, by perſpective glaſſes, hath found in the ſtars
many things unknown to the ancients. *Raleigh*.

* **ASTROLOGIAN.** *n. ſ.* [from *aſtology*.] The
ſame with *aſtrologer*.—The twelve houſes of hea-
ven, in the form which *aſtrologians* uſe. *Camden*.—

The ſtars, they ſay, cannot diſpoſe,
No more than can the *aſtrologian*. *Hudibras*.

* **ASTROLOGICALLY.** *adv.* [from *aſtology*.]
In an aſtrological manner.

* **ASTROLOGICAL.** } *adj.* [from *aſtology*.]

* **ASTROLOGICK.** } 1. Profeſſing aſtolo-
gy.—Some ſeem a little *aſtrological*, as when they
warn us from places of malign influence. *Watton*.

No *aſtrologick* wizard honour gains,
Who has not been oft baniſh'd, or in chains.]

Dryden.
2. Relating to aſtology.—*Aſtrological* prayers
ſeem to me to be built on as good reaſon as the
predictions. *Stillingfleet*.—The poetical fables are
more ancient than the *aſtological* influence, that
were not known to the Greeks till after Alexander
the Great. *Bentley*.

* **To ASTROLOGIZE.** *v. n.* [from *aſtology*.]
To praſtiſe aſtology.

(1.) * **ASTROLOGY.** *n. ſ.* [*aſtologia*, Lat.]
The praſtiſe of foretelling things by the knowledge
of the ſtars; an art now generally exploded, as

heretical and false—I know the learned think of the art of *astrology*, that the stars do not force the actions or wills of men. *Scyth*

1. *ASTROLOGY*, from *aster*, a star, and *logos*, discourse, was long considered as a *Science*, by which future events could be foretold, from the attributes and motions of the heavenly bodies. In the latter part of the term, astrology should signify no more than the doctrine or science of the stars, which was its original acceptation, and should the ancient astrology; though, in course of time, an alteration has arisen, that which the ancients called astrology, being afterwards termed *ASTRONOMY*. Astrology may be divided into two branches, *natural* and *judicial*.

1. *ASTROLOGY, NATURAL*, or *JUDICIARY*, is that which we commonly call simple astrology, in that which pretends to foretell moral events, such as have a dependence on the free will and agency of man, as if they were directed by the stars. This art, which owed its origin to the ancients, of late years on credit, is now universally disapproved by the intelligent part of mankind. The professors of this kind of astrology maintain, that the stars in heaven are one great volume or book, which every man may read his own fortune; and the mathematicians of his time—The art, they say, is lost. Some from the false heads of astrology, by the ancient Egyptians, whose sect was idolatrous, to ward their celestial observations, were intent on tracing the paths and periods of the heavenly bodies, they discovered a new method of analogy, between them and the things below, and hence were led to conclude that the stars spoke the destiny of men, and that the stars were presides of our fates, and disposed of our destinies. The laws therefore of this religion being astronomical, by a firm of observation, and the stars each planet has therein, by knowing the motions of any person's nativity, they were enabled, from their knowledge in astrology, to know a person's home or home of the person of the planets, at that point of time; and, by consulting the order of power of the planets, and how each was either strengthened or weakened by the sun, either to compute what might be the result thereof. Such are the arguments of the astrologers in favour of their science. Some of the sciences, more remaining to the mathematicians. Judicial astrology is commonly said to have been invented in Chaldea, and thence transmitted to the Egyptians, Greeks, and Romans; though some will have it of Egyptian origin, and others of the Chaldean. But it is to the Arabs we owe it. At Rome the people were formerly much given to the astrology, as they were in the east, the mathematicians, in the latter part of the empire, of the empire, to get them out of the city. See *CELESTIAL*. The Arabs, who introduced and propagated it among the Indians, have heavily made it. The history of good and evil, which was with great authority they have taken care to be preserved in the annals. The stars, which have prevailed in modern

ages and nations. The French historians remark that in the time of queen Catherine de Medici, astrology was so much in vogue, that the most considerable thing was not to be done without consulting the stars. And in the reign of Henry III. and IV. of France, the predictions of the astrologers were the common theme of the conversation. This predominant humour at court was well rallied by Barclay, in his comedy on occasion of an astrologer, who had dedicated to mistress king Henry in the event of a war threatened by the faction of the Guises.

(2.) *ASTROLOGY, NATURAL*, comprehends the predicting of natural effects, as, the changes of weather, winds, storms, hurricanes, thunder, earthquakes, &c. This art properly belongs to physiology, or natural philosophy, and may be deduced a *posteriori*, from phenomena and observations. For this species of astrology, Metastaseus makes an apology, in his History of the Astronomer, in natural history, a case put by authors to a white and splendid dog, in size, and of a roundish figure, resembling eyes of fishes.

ASTROMETEOROLOGY, the art of telling the weather, and its changes, from the aspects and configurations of the moon and planets. This makes a species of astrology, distinguished by some under the denomination of *meteorological* astrology.

ASTRONIUM, in botany: A genus of pentandria order, belonging to the dicotyledon plants. The male calyx consists of five unequal corolla is quinquepartite: Of the true calyx and corolla are the same as in the male, but one species, viz.

ASTRONOMIA GRAECOLATINA, a native of Italy. *ASTRONOMER*, *n. s.* [from *aster*, a star, and *nomos*, a rule or law] One that studies celestial motions, and the rules by which they are governed.—The motions of fictions and of the sun, ought to be like the motions, as the *astronomer* is, in the inferior orbs. See *ASTRONOMY*. No longer doubt of the motion of the planets about the sun. *Locke*.

The old and new astronomer, in van Attempt the heavenly motions to explain.

ASTRONOMICAL ASTRONOMY, from *astronomy*.] Belonging to astronomy. Our forefathers marking certain mutations in the sun's progress through the zodiac, they registerate and set them down in their almanac annals. *Newton's Vulgar Errors*.

Can he not pass an *astronomical* loss, Or dread the fun the imaginary loss? That he should not advance or calculate.

ASTRONOMICAL CALENDAR, an instrument, engraved on a copper plate, printed on paper, pasted on a board, with a brass ruler carried in it, it shows by inspection the sun's motion, time, right ascension, declination, rising, setting, &c. to a greater degree of exactness than the common globe.

ASTRONOMICAL PLACE, of a star or planet, its longitude or place in the ecliptic, measured

ASTROD.
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from the beginning of Aries *in consequentia*, or according to the natural order of the signs.

ASTRONOMICAL SECTOR, a very useful mathematical instrument, made by the late ingenious Mr Graham; a description of which is given in the course of the article ASTRONOMY.

ASTRONOMICALS, a name used by some

writers for sexagesimal fractions; on account of their use in astronomical calculations.

* ASTRONOMICALLY. *adv.* [from *astronomical*.] In an astronomical manner.

* ASTRONOMICK. See ASTRONOMICAL.
ASTRONOMICUS RADIUS. See RADIUS.

A S T R O N O M Y.

INTRODUCTION.

SECT. I. ETYMOLOGY and DEFINITIONS of ASTRONOMY.

(1.) THIS SCIENCE is defined by Dr Johnson as follows:

(2.) * ASTRONOMY. *n. f.* [*αστρονομία*, from *αστρον*, a star, and *νομος*, a law, or rule.] A mixed mathematical science, teaching the knowledge of the celestial bodies, their magnitudes, motions, distances, periods, eclipses, and order. Pythagoras taught that the earth and planets turn round the sun, which stands immoveable in the centre. From the time of Pythagoras, *astronomy* sunk into neglect, till it was revived by the Ptolemies, of Egypt; and the Saracens brought it from Africa to Spain, and restored this science to Europe. *Chambers.*—To this must be added the understanding of the globes, and the principles of geometry and *astronomy*. *Cowley.*

(3.) ASTRONOMY comprehends also, a knowledge of the natural causes on which all the phenomena of the heavenly bodies depend: and in this view, it is as much a branch of physics as of mathematics, and comprehends the theory of the whole universe.

SECT. II. HISTORY of ASTRONOMY.

(4.) None of the sciences appears to be of higher antiquity than astronomy. From the account given by Moses, of the creation of the celestial luminaries, it appears extremely probable, that our first progenitor received some knowledge of their nature and uses from his Almighty Creator himself. The Jewish Rabbins have adopted this opinion: and, indeed, it is natural to think, that visible objects would more readily excite the curiosity, or appear more worthy of the contemplation, of ADAM in a state of innocence, than the celestial bodies.

(5.) Consistently with this, Josephus ascribes to Noah and his posterity, a considerable degree of astronomical knowledge. He speaks of two pillars, the one of stone, and the other of brick, which he called the pillars of Seth, upon which they engraven the principles of the science; and he says that the former was still entire in his time. But be as it may, it is evident, that the great length of the antediluvian lives would afford such excellent opportunities for observing the heavenly bodies, that we cannot but suppose that the science of astronomy was considerably advanced before the flood. Josephus says, that longevity was be-

stowed upon them, for the very purpose of cultivating the sciences of geometry and astronomy; observing, that the latter could not be learned in less than 600 years; “for that period, he adds, is the *grand year*.”

(6.) By this remarkable expression, is probably meant, the period in which the sun and moon come again into the same situation in which they were at the beginning of it, with regard to the nodes, apogee of the moon, &c. “This period, says Cassini, of which we find no intimation in any monument of any other nation, is the finest period that ever was invented; for it brings out the solar year more exactly than that of Hipparchus and Ptolemy; and the lunar month within about one minute of what is determined by modern astronomers.” If the Antediluvians had such a period of 600 years, they must have known the motions of the sun and moon, more exactly, than their descendants knew them, for many ages after the flood.

(7.) Indeed, besides the motives of mere curiosity, which of themselves may be supposed to have excited people to a contemplation of the glorious celestial canopy, as far as that was possible, it is easily to be seen, that some parts of the science answer such essential purposes to mankind, that they could not long be possibly dispensed with. And it has been remarked, that traces of this science in different degrees of improvement, have been found among all nations.

(8.) Upon the building of the Tower of Babel, it is supposed that Noah retired with his children, born after the flood, to the north-eastern part of Asia, where his descendants peopled the vast empire of China. It is said also, that the Jesuit missionaries have found traditional accounts among the Chinese, of their having been taught this science, by their first emperor Fo-hi, who is supposed to be the same with Noah; and Kempter asserts, that Fo-hi discovered the motions of the heavens, divided time into years and months, and invented the 12 signs, into which they divide the zodiac, and which they distinguish by the following names; 1, the mouse; 2, the ox or cow; 3, the tiger; 4, the hare; 5, the dragon; 6, the serpent; 7, the horse; 8, the sheep; 9, the monkey; 10, the cock or hen; 11, the dog; and 12, the boar. They divide the heavens into 28 constellations, or classes of stars, allotting 4 to each of the 7 planets; so that the year always begins with the same planet; and their constellations answer

swer to the 28 lunar mansions used by the Arabian astronomers.

(9.) These constellations, however, they do not mark with the figures of animals, like most other nations, but by connecting the stars by straight lines, and denoting the stars themselves by small circles: so, for instance, the great bear would be marked as represented in Plate XXVIII. Fig. 10.

(10.) The Chinese themselves have many records of the high antiquity of their astronomy; though not without suspicions of great mistakes. They ascribe the discovery of the pole star, the invention of the sphere, and mariner's compass, &c. to their emperor Hong-Ti, the grandson of Noah. But, on more certain authority, it is asserted by Gaubil, that at least 120 years before Christ, the Chinese had determined by observation the number and extent of their constellations as they now stand; the situation of the fixed stars with respect to the equinoctial and solstitial points; and the obliquity of the ecliptic; with the theory of eclipses: and that they were, long before that, acquainted with the true length of the solar year, the method of observing meridian altitudes of the sun, by the shadow of a gnomon, and of deducing from thence his declination, and the height of the pole.

(11.) The same missionary also says, that the Chinese have yet remaining, some books of astronomy, which were written about 200 years before Christ; from which it appears, that the Chinese knew the daily motion of the sun and moon, and the times of the revolutions of the planets, many years before that period. Du Halde informs us, that Tcheou-cong, the most skilful astronomer that ever China produced, lived more than a thousand years before Christ; that he passed whole nights in observing the celestial bodies, and arranging them into constellations, &c. At present, however, the state of astronomy is but very low in that country, although it is cultivated at Peking, by public authority, in like manner as in most of the capital cities of Europe. This is ascribed, by Dr Long, to a barbarous decree of one of their emperors, to burn all the books in the empire, excepting such as related to agriculture and medicine.

(12.) The inhabitants of Japan, of Siam, and of the Mogul's empire, have also been acquainted with astronomy, from time immemorial; and the celebrated observatory at Benares, is a monument both of the ingenuity of the Hindoos, and of their skill in that science.

(13.) Astronomy, according to Porphyry, must have been of very ancient standing in the East. He informs us that, when Babylon was taken by Alexander, there were brought from thence, celestial observations for the space of 1903 years; which therefore must have commenced within 215 years after the flood, or within 15 years after building of Babel. Epigenes, according to Pliny, affirmed that the Babylonians had observations of 720 years, engraven on bricks.

(14.) Achilles Tatius ascribes the invention of astronomy to the Egyptians; and adds, that their knowledge of that science was engraven on pil-

lars, and by that means transmitted to posterity. BAILLY, in his elaborate History of ancient and modern Astronomy, endeavours to trace the origin of this science among the Chaldeans, Egyptians, Persians, Indians, and Chinese, to a very early period. And thence he maintains, that it was cultivated in Egypt and Chaldea, 2800 years before Christ; in Persia, 3209; in India, 3101; and in China, 2952 years before that era. He also apprehends, that astronomy had been studied even long before this distant period, and that we are only to date its revival from thence.

(15.) M. BAILLY, in investigating the antiquity and progress of astronomy among the Indians, examines and compares four sets of astronomical Tables of the Indian philosophers, viz. that of the Siamese, explained by M. Cassini in 1789; that brought from India, by M. le Gentil, of the Academy of Sciences; and two other manuscript tables, found among the papers of M. de Lamoignon, all of which agree together, and refer to the meridian of Benares. It appears, that the fundamental epoch of the Indian astronomy, is a conjunction of the sun and moon, which took place at the distance of 3102 A. A. C. And M. Bailly computes that such a conjunction really then happened.

(16.) He farther observes, that, at present, the Indians calculate eclipses, from observations made 5000 years ago; the accuracy of which, with regard to the solar motion, far exceeds that of the best Grecian astronomers. The lunar motions have been computed from the space through which that luminary passes in 1,600,984 days. They also use the cycle of 19 years, the same as that ascribed by the Greeks to Meton. Their theory of the planets is better than that of Ptolemy, as they do not suppose the earth in the centre of the celestial motions, and believe that Venus and Mercury move round the sun. Their astronomy also agrees with the most modern discoveries, with regard to the obliquity of the ecliptic, and the acceleration of the equinoctial points, &c.

(17.) In the Transactions of the Royal Society of Edinburgh, vol. ii. Professor PLAYFAIR has given a learned and ingenious dissertation on the astronomy of the Bramins, in which the great accuracy and high antiquity of the science among them is rendered extremely probable. It here appears, that their tables and rules of computation have peculiar reference to an epoch, and to observations 3000 or 4000 years A. C. Other instances are there given of the very considerable degree of mathematical knowledge, employed in their precepts and calculations.

(18.) It appears too, that astronomy was not unknown to the Americans; though in their division of time, they made use only of the solar, and not of the lunar motions. The Mexicans, in particular, had a strange predilection for the number 13: their shortest periods consisted of 13 days; their cycle of 13 months, each containing 20 days; and their century of 4 periods of 13 years each: this excessive veneration for the number 13, arose, according to Siguenza, from its being the number of their greater gods. Clavigero

ASTRONOMY.

PL. XV.

Fig. 4.

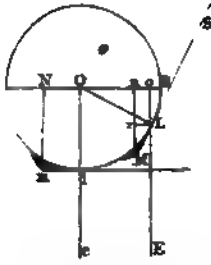


Fig. 1.

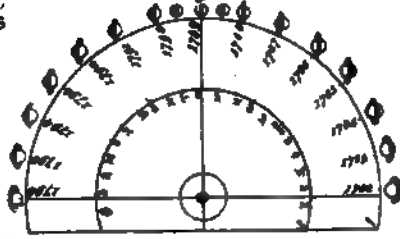
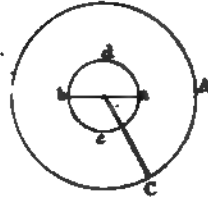


Fig. 2.



Earth
Radius of the Moon from the Earth
Distance of the 4th Satellite from the 3^d

Mercury
Venus
Mars
Satellites, double the distance of the 4th



Fig. 9.
Tycho's System.

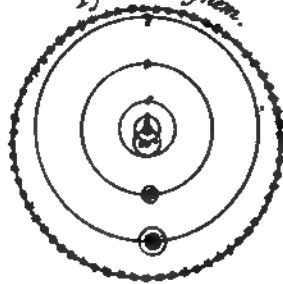


Fig. 3.

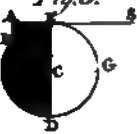


Fig. 7.

Time of the proportional Magnitudes of the Planetary Orbits
Orbit of the Perigee of Saturn

Fig. A.



Fig. 5.

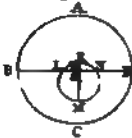


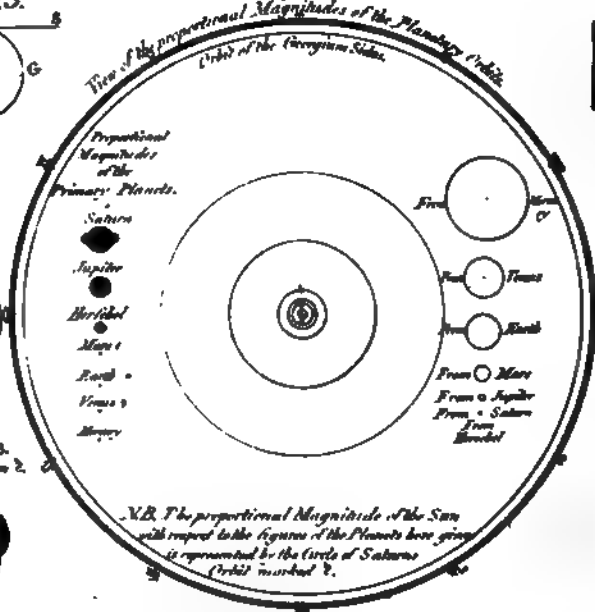
Fig. B.
Saturn 2.



Fig. 10.



Fig. C.



N.B. The proportional Magnitude of the Sun with respect to the figures of the Planets here given is represented by the Circle of Saturns Orbit marked 2.

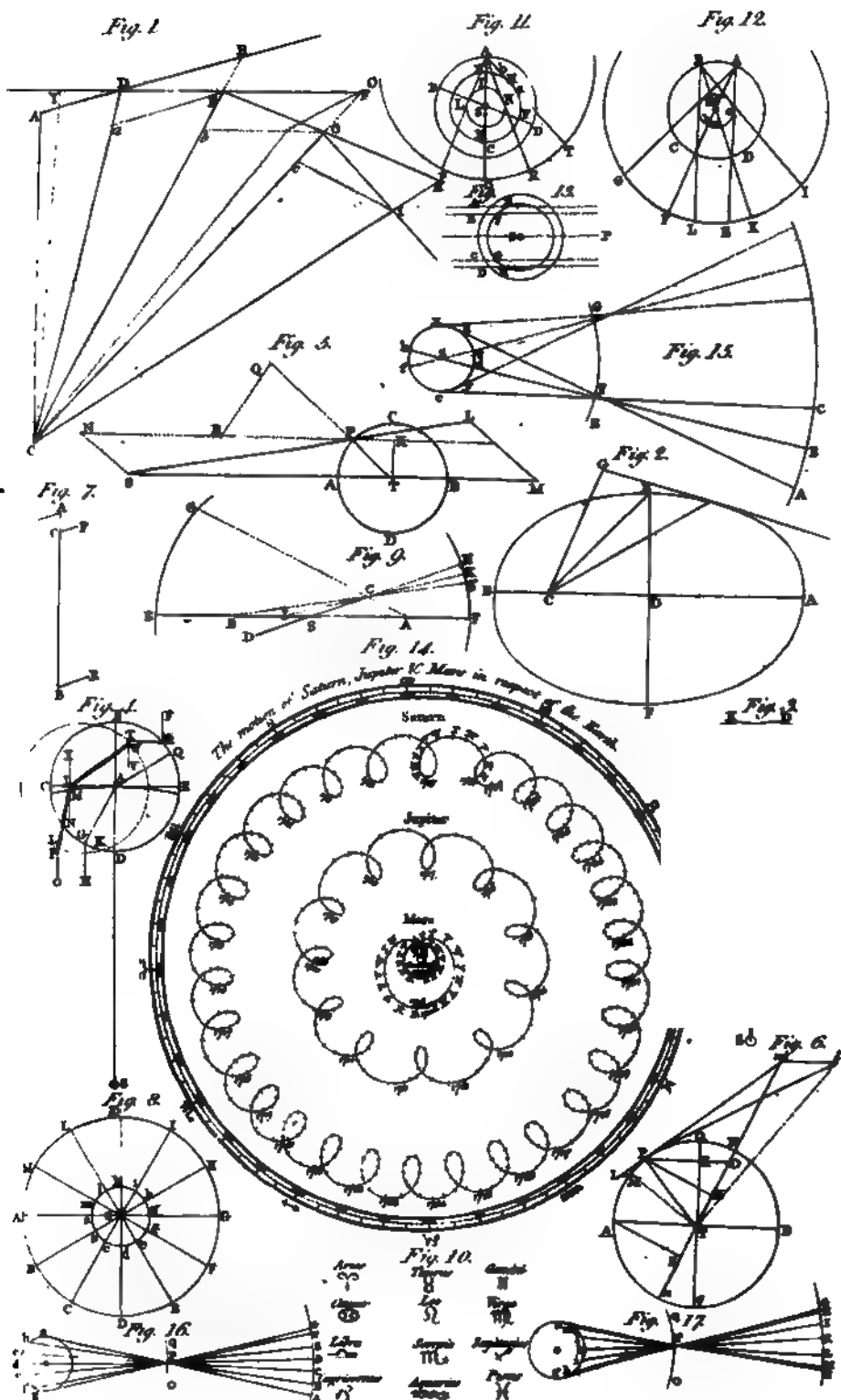




Fig. 1.

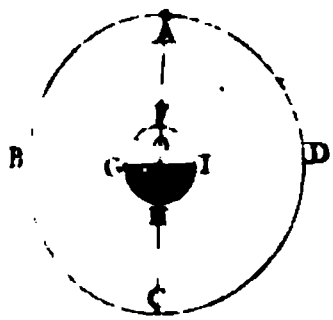


Fig. 2.

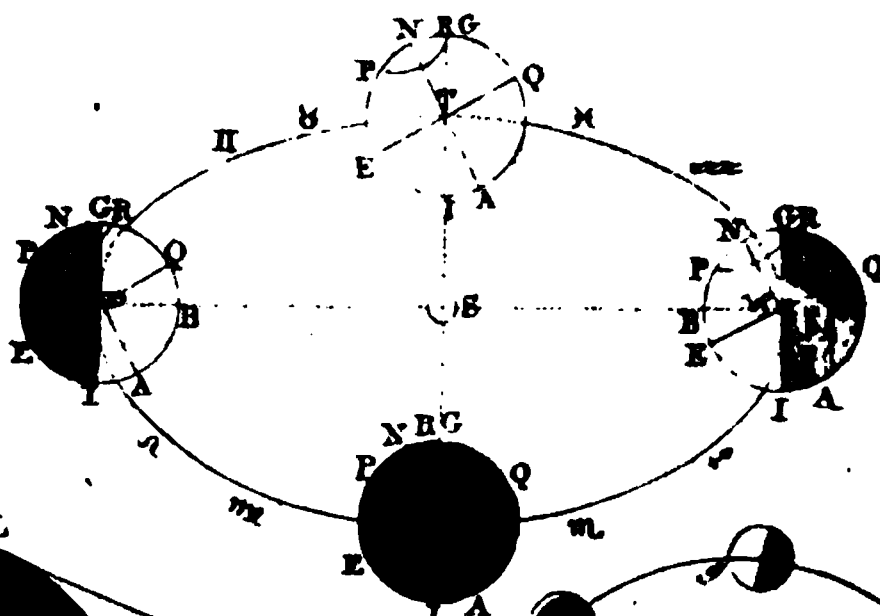


Fig. 4.

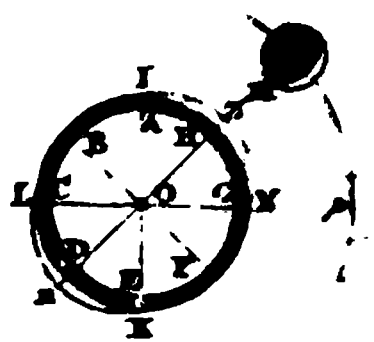


Fig. 6.

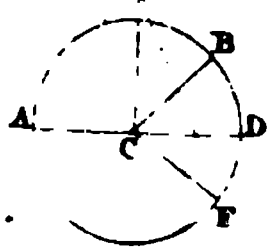


Fig. 3.

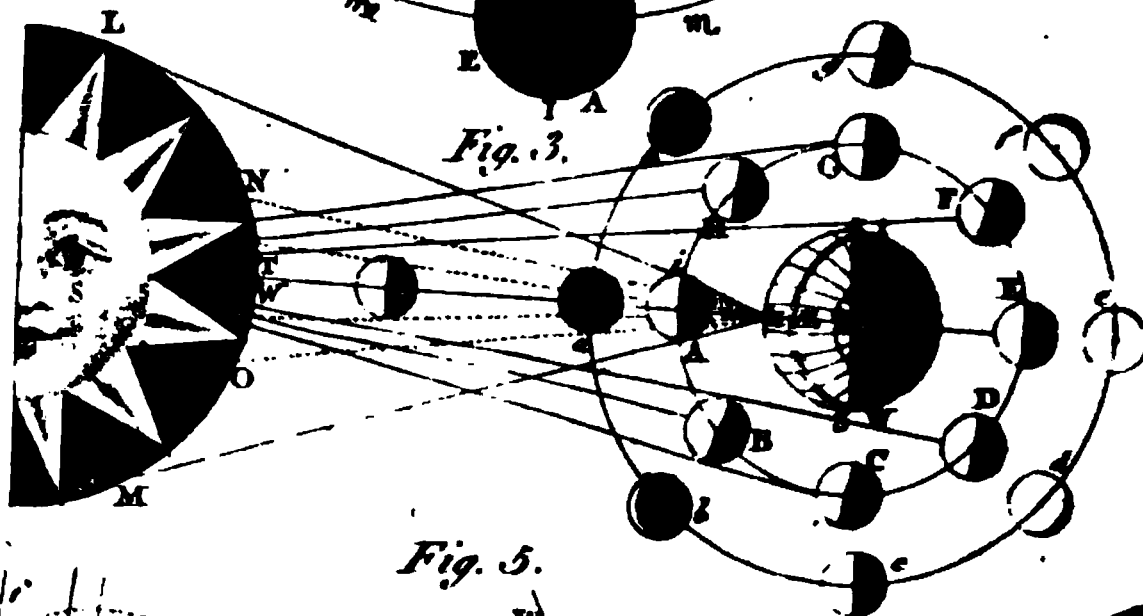


Fig. 12.

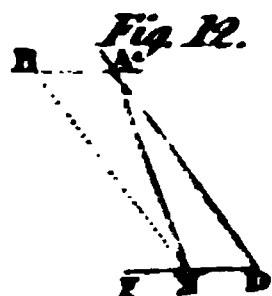


Fig. 5.

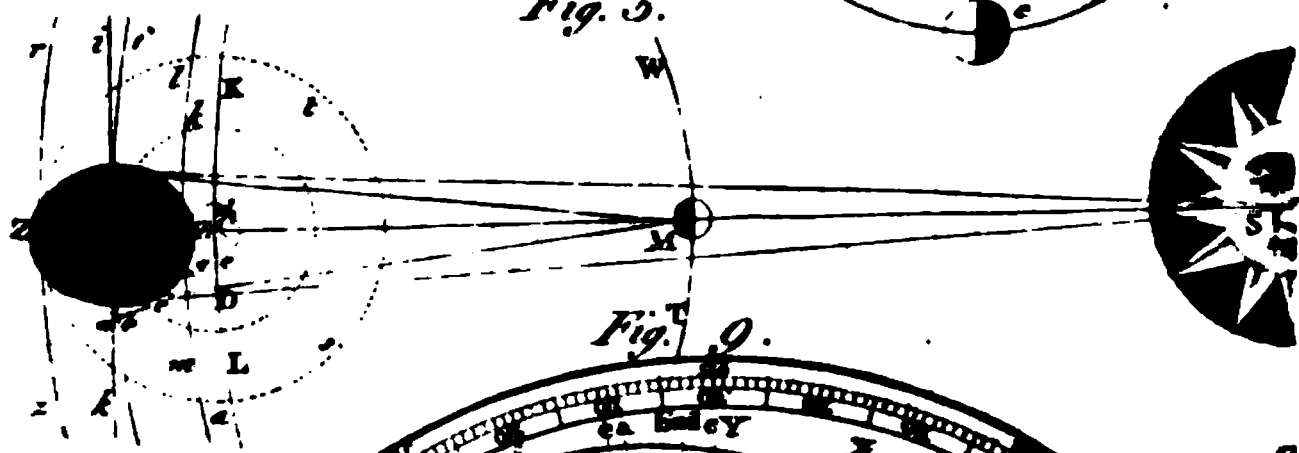


Fig. 9.

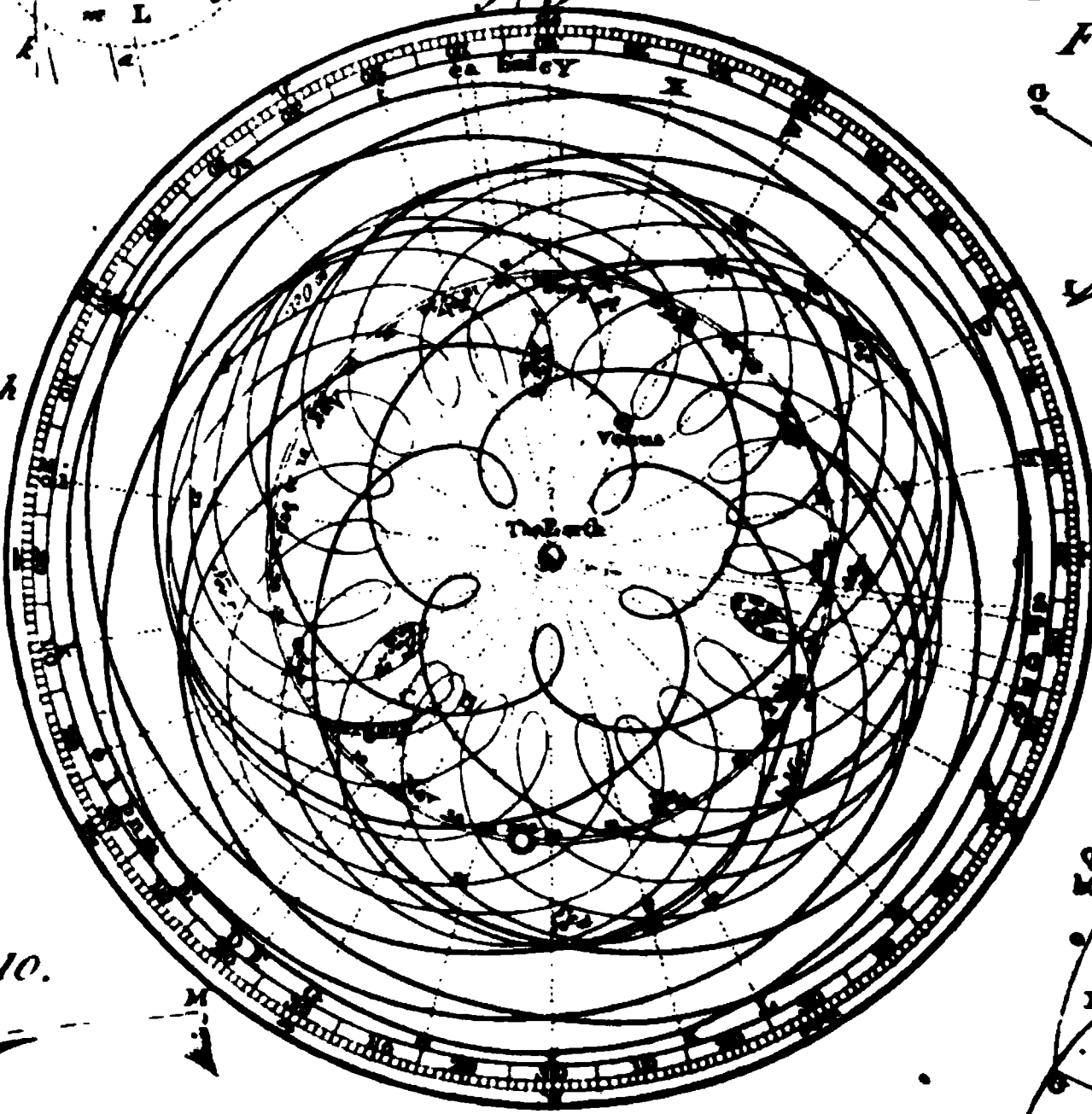


Fig. 7.

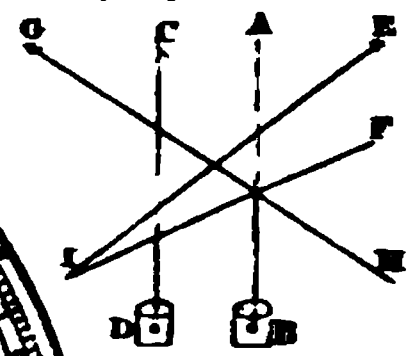


Fig. 8.

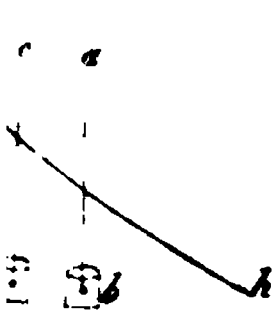


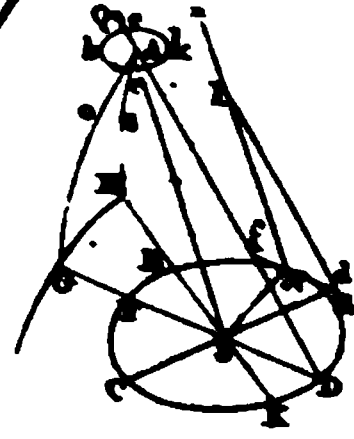
Fig. 10.



Fig. 11.



Fig. 13.





so asserts it as a fact, that, having discovered the excess of a few hours in the solar, above the solar year, they made use of intercalary days, to bring them to an inequality, as was done by Julius Cæsar in the Roman calendar; but with this difference, that instead of one day every 4 years, they interposed 13 days every 52 years.

(19.) The origin of astronomy and astrology, however, is fixed by most authors, either in Chaldea or in Egypt; and accordingly among the ancients we find the word Chaldean often used for astronomer, or astrologer. Indeed both these nations pretended to a very high antiquity, and claimed the honour of producing the first cultivators of this science. The Chaldeans boasted of their temple or tower of Belus, and of Zoroaster, whom they placed 5000 years before the destruction of Troy; while the Egyptians boasted of their colleges of priests, where astronomy was taught, and of the monument of Osymandyas, in which, it is said, there was a golden circle of 365 cubits in circumference, and one cubit thick, divided into 365 equal parts according to the days of the year, &c. It is indeed evident that both Chaldea and Egypt were countries very proper for astronomical observations, on account of the extended flatness of the country, and the purity and serenity of the air. The tower of Belus, or Babel itself, was probably an astronomical observatory; and the pyramids of Egypt, whatever they were originally designed for, might perhaps answer the same purpose; at least they shew the skill of this people in practical astronomy, as they are all placed with their four fronts exactly facing the cardinal points of the compass.

(20.) The Chaldeans began to make observations soon after the confusion of languages, as appears from the observations found there on the taking of Babylon by Alexander; and it is probable they began much earlier. They determined, with tolerable exactness, the length both of a periodical and synodical month. They discovered, that the motion of the moon was not uniform; and they even attempted to assign those parts of her orbit in which the motion is quicker or slower. We are assured by Ptolemy that they were not acquainted with the motion of the moon's apogee and nodes, the latter of which they supposed made a complete revolution in $658\frac{1}{4}$ days, or a little more than 18 years, and contained 223 complete lunations, which period is called the Chaldean SAROS.

(21.) PTOLEMY also gives us from Hipparchus, several observations of lunar eclipses made at Babylon above 720 years A. C. and Aristotle informs us, that they had many occultations of the planets and fixed stars by the moon; a circumstance which led them to conceive that eclipses of the sun were to be attributed to the same cause. They had also no inconsiderable share in arranging the stars into constellations, and the comets did not escape their observation. Dialling was also practised among them long before the Greeks were acquainted with that science.

(22.) The Egyptians were much of the same standing in Astronomy with the Chaldeans. Herodotus ascribes their knowledge in the science to

Sesostris; but probably not the same whom Newton makes cotemporary with Solomon, as they were acquainted with astronomy at least many hundred years before that æra. We learn, from the testimony of some ancient authors, that they believed the figure of the earth was spherical; that the moon was eclipsed by passing through the earth's shadow, though it does not certainly appear that they had any knowledge of the true system of the universe; that they attempted to measure the magnitude of the earth and sun, though their methods of ascertaining the latter were very erroneous; and that they even pretended to foretel the appearance of comets, as well as earthquakes and inundations. This science, however, gradually decayed, and in the time of Augustus it was entirely extinct among them.

(23.) Astronomy passed from Chaldea and Egypt to the Phœnicians, and was applied by that commercial people, to the purposes of navigation, steering their course by the north polar star; whence they became masters of the sea, and of almost all the commerce in the world. The Greeks, it is probable, derived their astronomical knowledge chiefly from the Egyptians and Phœnicians, by means of several of their countrymen who visited these nations, for the purpose of learning the different sciences. Newton supposes that the division into constellations was made about the time of the Argonautic expedition; but it is more probable that they were, at least most part of them, of a much older date, and derived from other nations, though clothed in fables of their own invention or application.

(24.) The fable of ATLAS supporting the heavens upon his shoulders, shows that some Mauritanian monarch of that name had made considerable advances in astronomical knowledge; and his discoveries had probably been communicated to the Greeks. Several of the constellations are mentioned by Hesiod and Homer, who lived about A. A. C. 870. Their knowledge in this science however was greatly improved by Thales the Mileſian, and other Greeks, who travelled into Egypt, and brought from thence the chief principles of the science. Thales was born about A. A. C. 640, and he was the first among the Greeks, who observed the stars, the solstices, and predicted the eclipses of the sun and moon.

(25.) The science was farther cultivated and extended by his successors Anaximander, Anaximenes, and Anaxagoras; but especially by Pythagoras, who about A. A. C. 577, brought from Egypt the learning of these people, taught it in Greece and Italy, and founded the sect of the Pythagoreans. He taught that the sun was in the centre of the universe; that the earth was round; that there were antipodes; that the moon reflected the rays of the sun, and was inhabited like the earth; that comets were a kind of wandering stars, disappearing in the further parts of their orbits; that the white colour of the milky way was owing to the united brightness of a great multitude of small stars; and he supposed that the distances of the moon and planets from the earth, were in certain harmonic proportions to one another.

(26.) PHILO-

(16.) PHITOLAUS, a Pythagorean, who flourished about B. C. 450, and asserted the annual motion of the earth on her own axis, was taught by Hicetas, a Syracusan. About the same time Meton and Euclemon, born at Athens, where they observed the summer solstice, A. C. 473, with the nights and lengths of the days, and what seasons they ascribed to. Meton also invented the cycle of years, which still bears his name.

(35.) EUDOXOS, of Cnidus, lived about A. C. 400, and was one of the most distinguished astronomers and geographers of antiquity, and the inventor of the zodiac, or the zodiacal signs, and the inventor of the propositions in Ecliptic's Elements. He introduced geometry into the science of astronomy, and travelled into Asia, Africa, Sicily, and Italy, to improve it, and we are informed by Ptolemy, that he determined the annual year to contain 365 days, 6 hours, and also the periodical times of the planets, and made other important discoveries and observations. Calippus flourished soon after Eudoxus, and has celestial sphere is mentioned by Aristotle; but he is better known by a period of 70 years which he invented, containing 4 corrected sidereal months, and 4 such consecutive years forming Calippus' year. About this time the knowledge of the Pythagorean system was carried into Italy, Gaul, and Egypt, by certain colonies of Greeks.

(18.) VIRGILIUS, however, represents the introduction of astronomy of Greece, in a manner somewhat different. He maintains, that Hercules, a Babylonian, brought it immediately from Babylon, and equated it with the Egyptian science of the Nile. Co. A. de Myny says, that in confirmation of his wonderful prodigies, the Athenians agreed to give him the name of γαλματῶν, with a willed to be. But if Hercules be the same person as that of Chaldei, his knowledge of the stars have belied his hands. About this time, or rather earlier, the Greeks having begun to plant colonies in Asia, Gaul, and Egypt, the science became acquainted with the nations of the East. The first of these was the Assyrian, concerning whose astronomy Julius Caesar informs us that the latter were skilled to tell seasons, and that the Gauls in general were all astrologers, so that at that time they could be said to be acquainted with the science of astronomy, and a mixture of Pythagoras, who lived a Markles in the time of Ae under the Great, that observed the altitude of the sun at the summer's solstice by means of a gnomon. He was obliged to have travelled as far as Thule to settle the climates.

190. After Aes' death, the Kermes flourished in Egypt, under the patronage of Ptolemy Philadelphus, and by Lucius. It founded a house there, which continued till the invasion of the Saracens, A. C. 636. From the founding of that school, the science of astronomy advanced considerably. It flourished about A. C. 270. Ptolemy asserted the Pythagorean system, and gave a method of determining the sun's distance by the anatomy of the moon.—Eratosthenes, who was born at Cyrene, A. C. 275, measured the circumference of the earth by a method he invented to Alexandria, from A. Ptolemy Euergetes, and made keeper of

the royal library there, he set up for their private astronomical spheres, which Hipparchus at Ptolemy the astronomer afterwards employed successfully in observing the heavens. He also determined the distance between the tropes, $\frac{1}{4}$ of the whole meridian circle, which makes the obliquity of the ecliptic in his time to be $23^{\circ} 51'$.

[30.] The celebrated ARCHIMEDIS, in created astronomy, as well as geometry and mechanics; determined the distances of the planets from one another, and constructed a kind of planetarium or orrery, to represent the phenomena and motions of the heavenly bodies.

(17.) Not to mention many others of the poets, who cultivated astronomy, HESIODUS who flourished about A. C. 700, was one who applied himself to the study of even the most obscure of the sciences, and his poems contain many precepts in it; he discovered that the seasons of the planets are eccentric, that the moon rises lower in her apogee than in her perigee, and that there was a motion of anticipation of the moon's eclipses, and that the eclipses of the sun and moon, collected accounts of the eclipses, &c. as had been made by the Egyptians and Chaldeans, and calculated all the things that happen for 600 years. He discovered that the moon's change of position was the indication of their own from W. to E. he corrected the Calippic period, and pointed out some errors in Eratosthenes's method for measuring the circumference of the earth, and computed the moon's motion more accurately than any other astronomer. His work is a catalogue of the fixed stars, the number of 1022, with their longitudes, bearings, and apparent magnitudes; which, with the names of the stars, and the names of the planets, and the names of the constellations, are preserved in the *Phænomena* of Aratus.

(13.) From the time of Hipparchus in the 2nd century B.C., little progress was made in astronomy. He was born at Pelusium in Egypt, at the end of the 3rd century, and made the greatest part of his observations at the celebrated school of Alexandria that country. Profiting by those of his predecessors, and his ancient programs, he first determined his own system, which he afterwards implicitly followed for many ages by his successors. He compiled a great work, called the *Synaxis*, in which contained the observations and calculations of his predecessors in astronomy. This was preferred from the configuration of the stars, and was used by the Saracens, in Persia, Arabia, and Spain. The Latin name of Greek original was not known in Europe until the beginning of the 15th century, when it was brought from Constantinople, then called *Constantinople*, by George, a monk of Trebizond, to whom it was translated into Latin, and

(13.) From A. D. 400, till the beginning of the sixteenth century, the western parts of Europe were almost entirely immersed in gross ignorance, while the East was kept in a state of profane ignorance by the books they had preserved of the wreck of the Alexandria library, which they had translated and improved all the sciences, and gave out as the only authorities, in which they had professed to be professors and authors. The clergy at this

it introduced a taste for the sciences into his empire. His grandson AL MAMUN, who ascended the throne in 814, was a great encourager and prover of the sciences, especially of astronomy. Having constructed proper instruments, he made many observations; determined the obliquity of the ecliptic to be $23^{\circ} 35'$; and under his auspices a degree of the circle of the earth was measured a good time in the plain of Singar, on the border of the Red Sea.

(34.) About this time ALFERGANUS wrote elements of astronomy; and Albategnius, who flourished about the year 880, greatly reformed it, by comparing his own observations with those of Ptolemy. Hence he computed the motion of the sun's apogee from Ptolemy's time to his own; fixed the precession of the equinoxes at one degree in 70 years; and fixed the obliquity of the ecliptic at $23^{\circ} 35'$. The tables which he composed, for the meridian of Aracta, were long esteemed by the Arabians.

(35.) After this, though the Saracens had many eminent astronomers, several centuries elapsed without producing any very valuable observations, excepting those of some eclipses observed by BEN UNIS, astronomer to the caliph of Egypt, by means of which the quantity of the moon's acceleration since that time may be determined. Other eminent Arabic astronomers were, Arzachel, a Moor of Spain, who observed the obliquity of the ecliptic, and improved Trigonometry by constructing tables of sines, instead of chords of arches, dividing the diameter into 300 equal parts. Albategnius his contemporary, wrote upon the twilight, the height of the clouds, the phenomenon of the crescent moon, and first shewed the importance of the theory of refractions in astronomy.

(36.) ULUG BEG, grandson of the celebrated merlane, the Tartarian prince, a great proficients in practical astronomy, had very large instruments, particularly a quadrant of about 180 inches high, with which he made good observations. From these he determined the latitude of Samarkand, his capital, to be $39^{\circ} 37' 23''$; and composed astronomical tables for the meridian of the city so exact, that they differ very little from those constructed afterwards by Tycho Brahe.—His principal work was his catalogue of the fixed stars, made from his own observations in the year 1437.

(37.) At this period, almost all Europe was involved in ignorance; which began to be dispelled by the settlement of the Moors in Spain. The emperor Frederic II, about 1230, also began to encourage learning; restoring some decayed universities, founding a new one in Vienna; and causing the works of Aristotle, and Ptolemy's *Almagest*, to be translated into Latin. Two years after this, John de Sacro Bosco, that is of Halifax, compiled from Ptolemy, Albategnius, Alferganus, and other Arabic astronomers, his work *De sphaera*, which was held in the greatest estimation for 300 years after, and was honoured with commentaries by Clavius and other learned men. (38.) In 1240, ALPHONSO, K. of Castile, not only cultivated astronomy himself, but greatly encouraged others; and by the assistance of several learned men corrected the tables of Ptolemy, and

composed those which were denominated from him the ALPHONSINE TABLES. About the same time, ROGER BACON, an English monk, wrote several tracts relative to astronomy, particularly of the lunar aspects, the solar rays, and the places of the fixed stars; and about 1270, VITELLO, a Polander, composed a treatise on optics, in which he shewed the use of refractions in astronomy.

(39.) Till the time of PURBACH, who was born in 1423, little farther improvement was made in this science. He composed new tables of sines for every 10 minutes, making the radius 60, with 4 cyphers annexed. He constructed spheres and globes, and wrote several astronomical tracts; as, a commentary on Ptolemy's *Almagest*; some treatises on arithmetic and dialling, with tables for various climates; new tables of the fixed stars reduced to the middle of that century; and he corrected the tables of the planets, making new equations to them where the Alphonsine tables were erroneous. In his solar tables, he placed the sun's apogee in the beginning of Cancer; but retained the obliquity of the ecliptic $23^{\circ} 33\frac{1}{2}'$, as determined by the latest observations. He also observed some eclipses, made new tables for computing them, and had just finished a theory of the planets, when he died in 1462, being only 39 years of age.

(40.) PURBACH was succeeded in these labours by his pupil and friend, John Muller, commonly called Regiomontanus, who completed the epitome of Ptolemy's *Almagest*, which Purbach had begun; and after the death of his friend was invited to Rome, where he made many astronomical observations. Being returned to Nuremberg in 1471, by the encouragement of Bernard Walther, a wealthy citizen, he made several instruments for astronomical observations, among which was an armillary astrolabe, like that used at Alexandria by Hipparchus and Ptolemy, with which and a good clock then but a late invention he made many observations. He made ephemerides for 30 years to come, shewing the lunations, eclipses, &c.; printed the works of many of the most celebrated ancient astronomers, and wrote the theory of the Planets and Comets, and a treatise on Triangles, still in repute for several good theorems; computing the table of sines for every single minute, to the radius 1000000, and introducing the use of tangents also into trigonometry.

(41.) After Muller's death, which happened at Rome in 1476, in his 40th year, Bernard Walther collected his papers, and continued the astronomical observations till his own death. The observations of both were collected by order of the senate of Nuremberg, and published there in 1544 by John Schoner; they were also afterwards published in 1618 by Snellius, at the end of the observations made by the Landgrave of Hesse; and lastly with those of Tycho Brahe in 1666.

(42.) Walther was succeeded, as astronomer at Nuremberg, by JOHN WERNER, a clergyman, who observed the motion of the comet in 1500; and wrote several tracts on geometry, astronomy, and geography, in a masterly manner; the most remarkable of which are those concerning the motion of the 8th sphere, or of the fixed stars: in this tract, by comparing his own observations, made

in 1514, with those of Ptolemy, Alphonsus, and others, he shewed that the motion of the fixed stars, since called the precession of the equinoxes, is $1^{\circ} 10'$ in 100 years. He made also the first star of Aries 26° distant from the equinoctial point, and the obliquity of the ecliptic only $23^{\circ} 28'$; constructed a planetarium, representing the celestial motions according to the Ptolemaic hypothesis; and published a translation of Ptolemy's Geography, with a commentary, in which he first proposed the method of finding the longitude at sea by observing the moon's distance from the fixed stars. Werner died in 1528, aged 60.

(43.) NICOLAUS COPERNICUS rose next, and made so great a figure in astronomy, that the true system, discovered, or rather renewed by him, has been ever since stiled the COPERNICAN. He restored the old Pythagorean system of the world, which had been set aside from the time of Ptolemy. About A. D. 1507, he conceived doubts of the Ptolemaic system, and entertained notions about the true one, which he gradually improved by a series of astronomical observations, and the study of former authors. By these he formed new tables, and completed his work in 1530, containing a renovation of the true system of the universe, in which all the planets are considered as revolving about the sun. The work was printed in 1543, under the care of Schoner and Osiander, by the title of *Revolutiones Orbium Caelestium*; and the author received a copy of it a few hours before his death, on the 23d of May 1543, he being then 70 years of age.

(44.) After the death of this great luminary of Astronomy, the science and practice of it were greatly improved by Schoner, Nonius, Gemma, Frisius, Rothman, Byrgius, the Landgrave of Hesse, &c. Schoner reformed and explained the calendar, improved the methods of making celestial observations, and published a treatise on cosmography. He died 4 years after Copernicus.—Nonius wrote several works on mathematics, astronomy and navigation, and invented some useful and more accurate instruments than formerly: one of these was the astronomical quadrant, on which he divided the degrees into minutes by a number of concentric circles: the first was divided into 90 equal parts or degrees, the second into 89, the third into 88, and so on, to 46; so that, the index of the quadrant always falling upon or near one of the divisions, the minutes are known by an easy computation.

(45.) APPIAN's chief work, *The Caesarean Astronomy*, was published at Ingoldstadt in 1540; in which he shews, how to observe the places of the stars and planets by the astrolabe; to resolve astronomical problems by certain instruments; to predict eclipses, and to describe the figures of them; and the method of dividing and using an astronomical quadrant. To these are added observations of 5 comets, one of which has been supposed the same with that observed by Hevelius, and if so, it ought to have returned again in the year 1789; but astronomers were disappointed in their expectations.

(46.) GEMMA FRISIUS wrote a commentary on Arithmetic, accompanied with many diagrams, eclipses: he also invented the astronomical quadrant and several other instruments

useful in taking observations at sea; and was the first who recommended a time-keeper for determining the longitude. Rheticus began a very extensive work, being a table of sines, tangents and secants, to a very large radius, and to every 10 seconds, or $\frac{1}{2}$ of a minute; which was completed by his pupil Valentine Otho, and printed in 1594.

(47.) WILLIAM IV, Landgrave of Hesse Cassel, applied himself to the study of astronomy, about A. D. 1561; and, with the best instruments which could then be procured, made a great number of observations, published by Snellius in 1618, and preferred by Hevelius to those of Tycho Brahe. From these observations he formed a catalogue of 400 stars, with their latitudes and longitudes, adapted to the beginning of the year 1593.

(48.) TYCHO BRAHE, a Danish nobleman, began his studies about the same time with the Landgrave of Hesse, and observed the great conjunction of Jupiter and Saturn: but finding the usual instruments very inaccurate, he constructed many others much larger and more exact. In 1571, he discovered a new star in the chair of Cassiopea; which induced him, like Hipparchus on a similar occasion, to make a new catalogue of the stars; which he composed to the number of 777, and adapted their places to the year 1600. In 1576, by the favour of the king of Denmark, he built his new observatory, called URANIBURG, on the small island Huenna, opposite to Copenhagen, which he very amply furnished with many large instruments, some of them so divided as to the single minutes, and in others the arch might be read off to 10 seconds. One quadrant was divided according to the method invented by Nonius, that is by 47 concentric circles; but most of them were divided by diagonals; a method of division invented by Richard Chancellor, an Englishman. Tycho employed his time at Uraniburg to the best advantage, till the death of the king, when falling into discredit, he was obliged to remove to Holstein: he afterwards introduced himself to the Emperor Rodolph, with whom he continued at Prague till his death in 1601.—Tycho was the inventor of a system of astronomy, a kind of Semi-Ptolemaic, which he vainly endeavoured to establish instead of the Copernican. His numerous works, however, shew that he was a man of great abilities; and his discoveries, together with those of Purbach and Regiomontanus, were collected and published together in 1621, by Longomontanus, the favourite disciple of Tycho.

(49.) TYCHO, while residing at Prague with the emperor, prevailed on KEPLER to leave the university of Glatz, and to come to him: and Tycho dying in 1601, Kepler enjoyed all his life the title of mathematician to the emperor, who ordered him to finish the tables of Tycho Brahe, which he published in 1627, under the title of RODOLPHINE. He died about A. D. 1630, at Ratisbon, where he was soliciting the arrears of his pension. From his own observations, and those of Tycho, Kepler discovered several of the true laws of nature, by which the motions of the celestial bodies are regulated. He discovered that all the planets revolve about the sun, not in circular, but in elliptical orbits, having the sun as one of the foci of the ellipse; that their motions

are not equable, but varying, quicker or slower, as they are near to the sun, or farther from him; that the areas described by the variable line drawn from the planet to the sun, are equal in equal times, and always proportional to the times of describing them; and that the cubes of the distances of the planets from the sun, were in the same proportion as the squares of their periodical times of revolution. By observations also on comets, he concluded, that they are freely carried about among the orbits of the planets, in paths that are nearly rectilinear, but which he could not then determine.

(50.) At this time there were many other good proficient in astronomy; as Wright, Napier, Mayer, &c. WRIGHT made several good meridional observations of the sun, with a quadrant of 6 feet radius, in the years 1594, 1595, and 1596; from which he greatly improved the theory of the sun's motion, and computed more accurately his declination, than any person had done before. In 1599, he published also, an excellent work, entitled, "Certain Errors in Navigation discovered and detected," containing a method which has commonly, though erroneously, been ascribed to Mercator. To NAPIER we owe some excellent theorems and improvement in spherics, besides the ever memorable invention of logarithms. BAYER, a German, published his *URANOMETRIA*, or the figures of all the constellations visible in Europe, with the stars marked on them, and accompanied by names, or the letters of the Greek alphabet; a contrivance by which they may easily be referred to with distinctness and precision.

(51.) About the same time, astronomy was cultivated abroad by Mercator, Maurolycus, Maginus, Homelius, Schultet, Stevin, Galileo, &c. and in England by Thomas and Leonard Digges, John Dee, Robert Flood, Harriot, &c. The beginning of the 17th century was particularly distinguished by the invention of telescopes, and the application of them to astronomical observations. The more distinguished early observations with the telescope, were made by GALILEO, Harriot, Huygens, Hook, Cassini, &c. It is said that, from report only, Galileo made for himself telescopes, by which he discovered inequalities in the moon's surface, Jupiter's satellites, and the ring of Saturn; also spots on the sun, by which he found out the revolution of that luminary on its axis; and he discovered that the nebulae and milky way were full of small stars.

(52.) Mr HARRIOT, who had previously been known only as an algebraist, made much the same discoveries as Galileo, and as early, if not more so, as appears by his papers not yet printed, in the possession of the Earl of Egremont. And Mr HORROK, a young astronomer of great talents, found out in 1633, that the planet Venus would pass over the sun's disc on the 24th of November, 1639; an event which he announced only to his friend Crabtree; and these two were the only persons in the world that observed this transit. Horrox made also many other useful observations, and had even formed a new theory of the moon, taken notice of by Newton; but his early death, in

the beginning of 1640, put a stop to his useful and valuable labours.

(53.) HEVELIUS, Burgomaster of Dantzic, flourished about the same time, and observed the spots and phases of the moon; from which observations, he compiled his *Selenographia*. An account of his apparatus is contained in his work entitled *Machina Caelestis*, a book now very scarce, as most of the copies were accidentally burnt, with the whole house and apparatus, in 1679.—Hevelius died in 1688, aged 76.

(54.) Doctor Hook, a contemporary of Hevelius, invented instruments with telescopic sights, and censured the others. This occasioned a sharp dispute between them; to settle which, Halley was sent over to Hevelius to examine his instruments. The two astronomers made several observations together, very much to their satisfaction; and amongst them was one of an occultation of Jupiter by the moon, when they determined the diameter of the latter to be 30' 33".

(55.) HUYGENS and FONTANA, before the middle of the 17th century, greatly improved the construction of telescopes. The former constructed one of 123 feet, with which he observed the moon and planets, and discovered that Saturn was encompassed with a ring. With telescopes too, of 100 and 300 feet focus, Cassini saw five satellites of Saturn, with his stones or belts, and the shadows of Jupiter's satellites passing over his body. In 1666, AZOUR applied a micrometer to telescopes, to measure the diameters of the planets, and other small distances in the heavens: but an instrument of this kind had been invented before, by Gascoigne, though it was but little known abroad. To obviate the difficulties, arising from the great lengths of refracting telescopes and the aberration of the rays, Meriennus first started the idea of making telescopes of reflectors, instead of lenses, in a letter to Descartes; and in 1663 JAMES GREGORY of Aberdeen shewed how such a telescope might be constructed.

(56.) Sir ISAAC NEWTON, after spending some time on the construction of both sorts of telescopes, found out the great inconvenience which arises to refractors from the different refrangibility of the rays of light; for which not finding a remedy, and pursuing the other kind, in 1672, he presented to the Royal Society two reflectors, constructed with spherical speculums. The inconvenience, however, arising from the different refrangibility of the rays of light, has since been fully obviated by Dollond.

(57.) Towards the end of the 17th, and beginning of the 18th century, practical astronomy rather languished; but the speculative part was carried to the highest perfection by Newton in his *Principia*, by David Gregory, Keil, and others. Soon after this, great improvements of astronomical instruments began to take place, particularly in Britain. GRAHAM not only improved clocks and watch work, but also carried the accuracy of astronomical instruments to a surprising degree. He constructed the old eight-feet mural arch at the Royal Observatory, Greenwich, and a small equatorial sector for making observations out of the meridian; but he is chiefly remarkable for

The theory of the moon was particularly considered by Clairault, D'Alembert, Euler, Mayer, Simpson, and Walmsly, and especially Clairault, Euler, and Mayer, who computed complete sets of lunar tables: those of the last of these authors, for their superior accuracy, were rewarded with a premium of L. 3000, and brought into use in the computation of the Nautical Ephemeris, published by the Board of Longitude. The most accurate tables of the satellites of Jupiter were composed from observations by WARGENTIN, an excellent Swedish astronomer.

(64.) Among the many French astronomers who contributed to the advancement of the science, was particularly indebted to DE LA CAILLE for an excellent set of solar tables; who, in 1750, went to the Cape of Good Hope to make observations in concert with the most celebrated astronomers in Europe, for determining the parallax of Mars and the moon, and thence, that of the sun, which it was concluded did not much exceed 3 seconds. Here he re-examined and adjusted, with great accuracy, the stars about the southern pole; and also measured a degree of the meridian. In Italy the science was assiduously cultivated by Bianchini, Boscovich, Frisi, Manfredi, Zanotti, and many others; in Sweden by Wargentín, already mentioned, Blingenstern, Mallet, and Planck; and in Germany by Euler, Mayer, Lambert, Borchow, and others.

(65.) In 1760, all the learned Societies in Europe made preparations for observing the transit of Venus over the sun, which had been predicted by Halley more than 80 years before, with the use of which it might be made of it in determining the sun's parallax, and the distances of the planets from the sun. The same exertions were repeated, to observe the transit in 1769, by sending observers to different parts of the world; and from the whole, it was computed that the sun's parallax was nearly 3 seconds, and consequently the distance of the sun from the earth about 24114 of the earth's diameters, or 96 millions of miles. Bradley was succeeded, in 1762, in his office of Astronomer Royal, by BLISS, Savilian professor of astronomy; who, being in a declining state of health, did not long enjoy it.

(66.) In 1765, Bliss was succeeded by NEVIL MASKELYNE, the present Astronomer Royal, who, in January 1761, was sent by the Royal Society, at a very early age, to the island of St Helena, to observe the transit of Venus over the sun, and the parallax of the star Sirius. The first of these observations partly failed, by clouds preventing the sight of the 1st internal contact; and the 2^d also, owing to Short having suspended the plumb-line by a nail from the neck of the central pin. However, Maskelyne indemnified himself by many other valuable observations: Thus, he observed at St Helena, the parallax of the star Sirius; the horary parallaxes of the moon; and the effect of a clock, to find, by comparison with its previous going which had been observed in England, the difference of gravity at the two places; and, in going out and returning, he practised the method of finding the longitude by the lunar distances taken by Hadley's Quadrant, making out tables for the use of seamen, and teaching the me-

thod to the officers on board the ship; which was explained in the Philosophical Transactions, for 1762, and more fully afterwards in the British Mariner's Guide, published in 1763. In September 1763, he sailed for the island of Barbadoes, to settle the longitude of the place, to examine Harrison's watch, and to try Irwin's marine chair. While at Barbadoes, he made many other observations, and amongst them, many relating to the moon's horary parallaxes, not yet published.

(67.) MASKELYNE returning to England in the end of 1764, recommended to the Board of Longitude the lunar method of finding the longitude; and proposed to it the project of a Nautical Almanac, to be calculated and published to facilitate that method. This the Board agreed to, and the first volume was published for 1767, and has continued ever since under his direction, to the great benefit of navigation.

(68.) In consequence of a proposal, made by this astronomer to the Royal Society, the project was formed of measuring accurately the effect of some mountain on the plumb-line, in deflecting it from the perpendicular; and SCHEHALLIEN, in Scotland, having been found the most convenient in this island for the purpose, he went into Scotland to conduct the business; by which experiment he shewed, that the sum of the deflections on the two opposite sides was about $11\frac{1}{2}$ seconds of a degree; and proved, to the satisfaction of the whole world, the universal attraction of matter. From the data resulting from these measures, Dr HUTTON has computed the mean density of the whole manner in the earth, to be about $4\frac{1}{2}$ times that of common water.

(69.) The discoveries of Dr HERSCHEL form a new æra in astronomy. In 1781, he began with observations on the periodical star in *Colla Ceti*, and a new method of measuring the lunar mountains, none of which he made more than half a mile in height; and, having constructed telescopes far more powerful than any former ones, proceeded to other observations; such as, on the rotation of the planets round their axes; on the parallax of the fixed stars; catalogues of double, triple, &c. stars; on the proper motion of the sun and solar system; on the remarkable appearances of the solar regions of the planet Mars, &c. Above all, his discoveries of a new primary planet, on the 13th of March 1781, called by him the GEORGIAN PLANET, but named the HERSCHEL by foreign astronomers; and of its two satellites, discovered since that time, has greatly enlarged the bounds of the solar system, this new planet being more than twice as far from the sun as the planet Saturn.

(70.) Historical accounts and lists of the principal authors and writings on this science, are contained in Weidler's and Bailly's History of Astronomy. Adam, Vossius, Bayle, Chauffepie, Nicéron, Perraut, the chronological table of Riccioli, and that of Sherburne, at the end of his edition of Manilius; and the first volume of De la Lande's astronomy, may also be consulted. The more modern and popular books on astronomy are very numerous, and well known; as those of Ferguson, Long, Emerson, Vince, De la Lande, Leadbetter

PART I.

OF THE APPEARANCES OF THE CELESTIAL BODIES.

SECT. I. Of the CELESTIAL BODIES, as first by the NAKED EYE.

(71.) The most obvious celestial phenomenon in the daily rising of the Sun in the east, and his setting in the west; next to which is that of the Moon and STARS appearing, and keeping the same westerly course. These cannot be long taken notice of before we must perceive that neither the sun nor moon always rises exactly in the same point of the heavens. If we observe the sun, from the beginning of March, we find that he seems to rise about every day sensibly more to the northward, than he did the day before, to continue longer above the horizon, and to be more elevated at mid-day, till towards the end of June, when he is observed to move backward in the same manner; this retrograde motion continues beyond the middle of December, when he begins again to move forwards, and so on.

(72.) When the New Moon (as she is called, at her early period,) first becomes visible, she appears in the western part of the heavens, at no great distance from the sun. Every night she increases in size, and removes to a greater distance from the sun; till at last she appears in the eastern part of the horizon, just at the time the sun disappears in the western. After this she gradually moves further and further eastward, rising every night later and later, till at last she seems to approach the sun as nearly in the east as she did in the west, and rises only a little before him in the morning, as in the first part of her course the sun the west not long after him. All these different appearances are completed in the space of a month; after which they begin in the same order as before.

(73.) Several of the stars neither rise in the E. nor set in the W. but seem to turn round an immovable point, near which is placed a single star called the pole, or POLAR STAR. This point is more or less elevated according to the different parts of the earth from which we take our view. The inhabitants of Lapland, for instance, see it much more elevated above the horizon than we do; we see it more elevated than the inhabitants of France and Spain; and they, again, see it more elevated than the inhabitants of Barbary. By continually travelling south, the star at last seems depressed in the horizon, and another point appears directly opposite to it, round which the stars in the southern part of the horizon seem to turn. In this part of the heavens, however, there is no star so near the pole as there is in the northern part; nor is the number of stars in the southern part of the heavens so great as in the northern part.

(74.) Supposing us still to travel southward, the north pole entirely disappears, and the whole hemisphere appears to turn round a single point in the south, as the northern hemisphere appears to us to turn round the pole star. The general ap-

pearance of the heavens, therefore, in the vast concave sphere, turning round two points fixed in the north and south parts of it, takes place in a few hours.

(75.) The majority of the stars being fixed with respect to one another; that is, they serve two stars having a certain space between them from each other one night, they keep the same every succeeding night. But some of the heavens do not appear to be fixed, some of them change their places, and some of the fixed stars, and to one another, were only observed formerly; but they are now discovered a sixth. They are distinguished by the appellation of PLANETS, from wandering; and called by the names of Mercury, Mars, Jupiter, Saturn, and the Georgium Sidus. The fixed stars are distinguished from the planets by continuing that appearance which is called the firmament of the stars.

(76.) MERCURY is a small star, with a very bright white light; but by always being near the sun, he is seldom to be seen; he does make his appearance, his motion the sun is so swift, that he can only be seen a short time, a little after sunrise, or a little before sunset.

(77.) VENUS, the most beautiful of the stars, known by the names of the morning star, keeps near the sun, then double the distance of Mercury from the sun in the eastern quarter of the heavens; he is in the western; but seems to stand evening, or to give notice of his approaching.

(78.) MARS is of a red very eclipsed, and a much duller light than Venus, but sometimes he equals her in size. He is subject to the same limitation in his motions as Venus; but appears sometimes very bright, and sometimes at a great distance from her, he does rising when the sun sets, or setting when the sun rises. Of this planet it is remarkable, that as he approaches any of the fixed stars, they of their colour, grow dim, and often become invisible, though at some little distance the body of the planet has himself thinks to have been exaggerated by former astronomers.

(79.) JUPITER and SATURN often appear at great distances from the sun. The former with a bright white light, and the latter with a pale faint one; and the motion of JUPITER is so slow, that, unless carefully observed, he will not be thought to move at all. His motion is still slower, and he is seldom to be seen without a telescope.

(80.) The apparent magnitudes of these planets are very different at different times. Every person must have observed that Venus is not equally big; and this apparent difference of size is so remarkable, that the apparent size is sometimes larger at some times than others. This increase of magnitude is likewise remarkable in Mars and Jupiter, but less so in Mercury, and Herschel. Their planets do not appear to us to move regularly.



Fig. 1. The Moon in her mean libration, with the Spots, according to Riccioli, Cassini, &c.

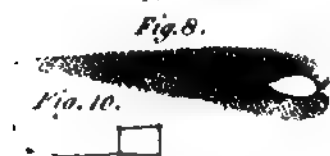
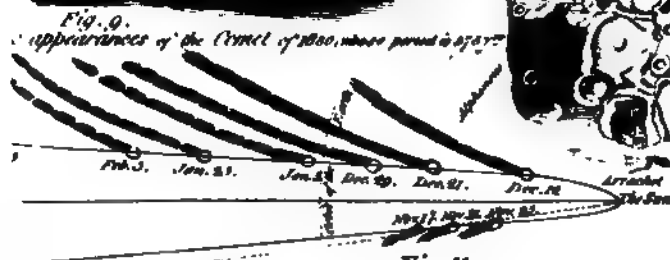
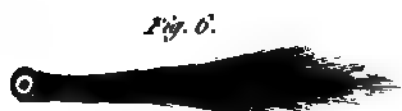
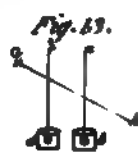
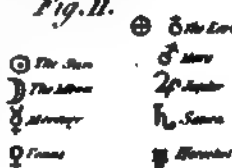


Fig. 2. Part of the Moon from Russell.



Fig. 11.



Printed for the Astronomical Observatories

- 15 Eratosthenes.
- 16 Timochares.
- 17 Plato.
- 18 Archimedes.
- 19 Infula Sinus Medii.
- 20 Pitagoras.
- 21 Thales.
- 22 Eudoxus.
- 23 Aristoteles.
- 24 Manilius.
- 25 Metastatus.
- 26 Hermes.
- 27 Ptolemy.
- 28 Hieronymus.
- 29 Plinius.
- 30 Catharina Cyrenus.
- 31 Theophilus.
- 32 Praetorius.
- 33 Promontorium acutum.
- 34 Centorinus.
- 35 Messala.
- 36 Promontorium Somali.
- 37 Procius.
- 38 Cleomedes.
- 39 Scellus et Furnerios.
- 40 Petrius.
- 41 Langrenus.
- 42 Tarantius.
- 43 Hericel's Volcano.
- 44 Mare Humorum.
- 45 Mare Nubium.
- 46 Mare Imbrium.
- 47 Plinius.
- 48 Catharina Cyrenus.
- 49 Theophilus.
- 50 Praetorius.

(106.) MERCURY, when looked at through telescope magnifying about 200 or 300 times, appears equally luminous throughout his whole surface, without the least dark spot. He appears to have the same phase with the moon, being sometimes horned, sometimes gibbous, and sometimes shining almost with a round face, though not entirely full, because his enlightened side is never turned directly towards us; but at all times perfectly well defined without any ragged edge, and perfectly bright.

(107.) VENUS, when viewed through a telescope, is rarely seen to shine with a full face, but his phases and changes like those of the moon, by increasing, decreasing, being horned, gibbous, &c. Her illuminated part is constantly turned toward the sun; being oriented toward the east when the sun is a morning star, and toward the west when an evening star. Her different phases were first discovered by Galileo. Dr. HERSCHTEL has published, in the Phil. Trans. for 1792, a long series of observations on this planet, from which he concludes 1. that the planet revolves about its axis, but that the period, and the position of the axis are uncertain; 2. that the planet's atmosphere is very considerable; 3. that there are probably hills and inequalities upon its surface, though he has not been able to see much of them, owing, perhaps, to the density of its atmosphere; and, 4. that this planet is somewhat larger than the earth, instead of being less, as former astronomers have imagined.

(108.) Much larger and more remarkable spots have been perceived on the disk of MARS, than on that of any other primary planet. By very accurate observations HERSCHTEL has determined the proportion between the polar and equatorial diameters, and the length of the day in this planet. He has also given some good conjectures on its nature and its atmosphere. The latter it is now ascertained to have; but though considerable, the atmosphere is not of so great an extent as the conjectures on former observations led astronomers to imagine.

(109.) JUPITER has the same general appearance with Mars, only that the belts on his surface are much larger and more permanent. Their number is very variable, as sometimes only one, at other times no fewer than 8, may be per-

ceived. They are generally parallel to one another, but not always so; and their breadth is likewise variable, one belt having been observed to grow narrow, while another in its neighbourhood has increased in breadth, as if the one had been absorbed into the other. The time of their continuance is very uncertain, sometimes remaining unchangeable for three months; at others, new belts have been formed in an hour or two. In some of these large black spots have appeared, which move swiftly over the disk from east to west, and are turned in a short time to the same place whence the rotation of this planet about its axis has been determined.

(110.) The figure of Jupiter is evidently an oblate spheroid, the longest diameter of his disk being to the shortest as 13 to 12. His rotation from west to east, like that of the sun and planets, is a very nearly coincident with that of his orbit, so that there can scarce be any difference of seasons in that planet. His rotation has been observed to be somewhat quicker at aphelion than his perihelion.

(111.) The most remarkable circumstance attending this planet is his having four moons, or SATURNIANS, which constantly revolve round him at different distances. These are all supposed to move in ellipses; though the eccentricities of them are too small to be measured, except that of the fourth; and even this amounts to more than 0.0007 of its mean distance from the primary.

(112.) The periodic times and distances of the satellites, in semidiameters of Jupiter, as well in English miles, the angles under which they appear, as seen from the earth, at its greatest distance from Jupiter, taken from the latest and most exact observations, are as follow:

| N ^o | Periodic times. | Distances in | |
|----------------|------------------|--------------|-----------|
| | | Semidiam. | Miles. |
| 1 | 1d. 18h. 27' 34" | 5 1/2 | 266,000 |
| 2 | 3 13 23 48 | 9 3/4 | 493,000 |
| 3 | 7 3 48 36 | 14 1/2 | 694,000 |
| 4 | 16 16 32 9 | 25 1/2 | 1,189,000 |

(113.) The nodes of these satellites are in the same place. All of them, by reason of their immense distance, seem to keep near their primary, and their apparent motion is a kind of vibration like that of a pendulum, going alternately from their greatest distance on one side to their greatest distance on the other, sometimes in a straight line, and sometimes in an ellipse. When a satellite is in its superior conjunction, that half of its orbit which is more distant from the earth than Jupiter is, its motion appears direct, according to the order of the letters in its inferior conjunction, when it is nearer to the earth than Jupiter, its motion appears retrograde, and both these motions seem quicker the nearer the satellites are to the centre of the primary; the more distant they are, and at the greatest distance of all they appear for a short time to be stationary.

(114.) It is evident, from the appearance of Jupiter and his satellites, that the rotation of them must be the same as that of the primary. The rotation of the primary is proved towards us, by the motion of the belts, the latter of which are seen to move from east to west, and at every revolution to return to the same place. The rotation of the satellites is proved by the motion of the belts, which are seen to move from east to west, and at every revolution to return to the same place. The rotation of the satellites is proved by the motion of the belts, which are seen to move from east to west, and at every revolution to return to the same place.

To account for the appearance of the belts, it is necessary to suppose that they are permanent, and that they are situated at different distances from the primary. The belts are seen to move from east to west, and at every revolution to return to the same place. The belts are seen to move from east to west, and at every revolution to return to the same place. The belts are seen to move from east to west, and at every revolution to return to the same place.

(114.) It is evident, from this account of the system of Jupiter and his satellites, that occultations of them must frequently happen by their going behind their primary, or by coming in between us and it. The former takes place when they proceed towards the middle of their upper semicircle; the latter when they pass through the same part of their inferior semicircle. Occultations of the former kind happen to the 1st and 2nd satellite; at every revolution, the third very rarely escapes an occultation, but the fourth more frequently by reason of its greater distance. It is seldom that a satellite can be discovered upon the disk of Jupiter, even by the best telescopes, excepting at its first entrance, when, by reason of its being more directly illuminated by the rays of the sun than the planet itself, it appears like a lucid spot upon it. Sometimes, however, a satellite, passing over the disk, appears like a dark spot, and is easily to be distinguished. This is supposed to be owing to spots on the body of these secondary planets; and it is remarkable, that the same satellite has been known to pass over the disk at one time as a dark spot, and at another so luminous that it could not be distinguished from Jupiter himself, except at its coming on and going off.

(115.) To account for this phenomenon, we must say that either the spots are subject to change; or, if they be permanent like those of our moon, that the satellites at different times turn different parts of their globes towards us. Possibly both these causes may contribute to produce the phenomena just mentioned. For these reasons also both the light and apparent magnitude of the satellites are variable: for the fewer spots there are upon that side which is turned towards us, the brighter it will appear; and as the bright side only can be seen, a satellite must appear larger the more of its bright side it turns towards the earth, and the less so the more it happens to be covered with spots. The fourth satellite, though generally the smallest, sometimes appears bigger than any of the rest: the third sometimes seems largest, though usually the largest; nay, a satellite may be so covered with spots as to appear less than its shadow passing over the disk of the primary, though we are certain that the shadow must be smaller than the body which casts it.—To a spectator placed on the surface of Jupiter, each of these satellites would put on the various appearances of the moon; but they appear to us always round, having constantly their enlightened side turned towards the earth.

(116.) When these moons pass through their inferior semicircles, they cast a shadow upon Jupiter and thus cause an eclipse of the sun to his inhabitants; and in some situations this shadow may be observed going before or following the satellite. On the other hand, in passing through their superior semicircles, the satellites may be eclipsed, in the same manner as our moon is to us, by passing through the shadow of Jupiter: and this is usually the case with the first, second, and third of these bodies; but the fourth, by reason of the greatness of its orbit, passes sometimes above or below the shadow, as is the case with our moon. The beginnings and endings of these eclipses are

easily seen by a telescope when the earth is in a proper situation with regard to Jupiter and the sun; but when this or any other planet is in conjunction with the sun, the superior brightness of that luminary renders both it and the satellites invisible. From the time of its first appearing after a conjunction until near the opposition, only the immersions of the satellites into his shadow, or the beginnings of the eclipses are visible; at the opposition, only the occultations of the satellites, by going behind or coming before their primary, are observable; and from the opposition to the conjunction, only the immersions, or end of the eclipses are to be seen.

(117.) This is exactly true in the first satellite, of which we can never see an immersion with its immediately subsequent emersion: and it is but rarely that they can be both seen in the second; as in order to their being so, that satellite must be near one of its limits, at the same time that the planet is near his perihelion and quadrature with the sun. With regard to the third, when Jupiter is more than 46° from conjunction with, or opposition to, the sun, both its immersions and immediately subsequent emersions are visible; as they likewise are in the fourth, when the distance of Jupiter from conjunction or opposition is 24° .

(118.) When Jupiter is in quadrature with the sun, the earth is farthest out of the line that passes through the centres of the sun and Jupiter, and therefore the shadow of the planet is then most exposed to our view: but even then the body of the planet will hide from us one side of that part of the shadow which is nearest to it, through which the first satellite passes; which is the reason that, though we see the entrance of that satellite into the shadow, or its coming out from thence, as the earth is situated on the east or west side thereof, we cannot see them both; whereas the other satellites going through the shadow at a greater distance from Jupiter, their ingress and egress are both visible. The relative distances of these moons from their primary, are shewn in Plate XV. fig. 11.

(119.) SATURN, when viewed through a good telescope, makes a more remarkable appearance than any of the other planets. Galileo first discovered his uncommon shape, and from the discoveries made by him and other astronomers, it appears that this planet is surrounded by a broad thin ring, the edge of which reflects little or none of the sun's light to us, but the planes of the ring reflect the light in the same manner that the planet itself does; and if we suppose the diameter of Saturn to be divided into 3 equal parts, the diameter of the ring is about 7 of these parts. The ring is detached from the body of Saturn in such a manner, that the distance between the innermost part of the ring and the body is equal to its breadth. If we had a view of the planet and his ring with our eyes, perpendicular to one of the planes of the latter, we should see them as in Plate XV. fig. A.; but our eye is never so much elevated above either plane as to have the visual ray stand at right angles to it, nor indeed is it ever elevated more than about 30° above it; so that the ring, being commonly viewed at an oblique angle, appears of an oval form, and through very

good telescopes double, as represented Plate XV. fig. 11. and fig. B.

(120.) Both the outward and inward rim are projected into an ellipsis, more or less oblong according to the different degrees of obliquity with which it is viewed. Sometimes our eye is in the plane of the ring, and then it becomes invisible; either because the outward edge is not fitted to reflect the sun's light, or more probably because it is too thin to be seen at such a distance. As the plane of this ring keeps always parallel to itself, that is, its situation in one part of the orbit is always parallel to that in any other part, it disappears twice in every revolution of the planet, that is about once in 15 years; and he sometimes appears quite round for months together. At other times, the distance betwixt the body of the planet and the ring is very perceptible; and Mr Whiston tells us, that Dr Clarke's father saw a star through the opening.

(121.) When Saturn appears round, if our eye be in the plane of the ring, it will appear as a dark line across the middle of the planet's disk; and if our eye be elevated above the plane of the ring, a shadowy belt will be visible, caused by the shadow of the ring as well as by the interposition of part of it betwixt the eye and the planet. The shadow of the ring is broadest when the sun is most elevated, but its obscure parts appear broadest when our eye is most elevated above the plane of it. When it appears double, the ring next the body of the planet appears brightest; when the ring appears of an elliptical form, the parts about the ends of the largest axis are called the *ansæ*. These, a little before and after the disappearing of the ring, are of unequal magnitude: the largest *ansæ* is longer visible before the planet's round phase, and appears again sooner than the other. In the diagram, Plate XV. fig. 1. are delineated the phases of the ring from its full appearance in 1782 to its disappearance in 1789, and its full re-appearance in 1796.

(122.) Dr HERSCHEL has found that the ring is double or that there are two concentric rings; also that it has a motion of rotation in its own plane, its axis of motion being the same as that of Saturn himself, and its periodical time 10h 32' 15".4: But he thinks it probable that the concentric rings may not revolve in the same period.— Their dimensions, and the space between them he states in the following proportion to each other:

| | miles. |
|------------------------------------|--------|
| Inner diameter of the smaller Ring | 146345 |
| Outside diam. of ditto | 184393 |
| Inner diam. of the larger Ring | 190248 |
| Outside diam. of ditto | 204883 |
| Breadth of the inner Ring | 20000 |
| Breadth of the outer ditto | 7200 |
| Breadth of the vacant space | 2839 |

(123.) Dr Herschel concludes, from his observations on the Ring, that its structure is such, as to allow it to remain permanently in its present state; nor does he think it at all probable that

the ring is of that changeable nature which some persons have imagined.

(124.) The same excellent astronomer from a series of observations on the belts of Saturn has concluded that he revolves upon his axis in 10h 10' 0".4, that he has a dense atmosphere, and that his polar diameter is to his equatorial one as 10 to 11.

(125.) Saturn has besides his ring seven little secondary planets or satellites revolving round it. One of them, which till lately was reckoned the 4th in order from Saturn, was discovered by Huygens in 1655 by means of a telescope 100 feet long; and the others, viz. the 1st, 2d, 3d, and 5th, at different times by Cassini, between 1671 and 1684, by the help of glasses of 100 and 136 feet. The 6th and 7th have lately been discovered by Herschel with his 40 feet reflecting telescope in 1787 and 1788. These he has called the 6th and 7th satellites, though they are nearer to Saturn than the other 5; that the names may not be mistaken with regard to former observations of them.

(126.) The periodical revolutions and distances of these satellites expressed in semidiameters of that planet, and in English miles are as follow.

| No. | Periodic times | Distances in | | Angles of Orb. |
|-----|----------------|-----------------|-----------|----------------|
| | | Semi-diam. | Miles | |
| 1 | 1d 21h 18' 27" | 4 $\frac{1}{2}$ | 170,000 | 1° 30' |
| 2 | 2 17 41 22 | 5 $\frac{1}{2}$ | 217,000 | 1 51 |
| 3 | 4 12 25 12 | 8 | 303,000 | 2 34 |
| 4 | 15 22 41 13 | 18 | 704,000 | 6 15 |
| 5 | 79 7 48 0 | 54 | 2,050,000 | 17 4 |
| 6 | 1 8 53 9 | 3 $\frac{1}{2}$ | 135,000 | 1 14 |
| 7 | 0 22 40 46 | 2 $\frac{1}{2}$ | 107,000 | 0 55 |

(127.) The four first describe ellipses like that of the ring and are in the same plane: their inclination to the orbit is from 30° to 31°. The 5th describes an orbit inclined from 17° to 18° to the orbit of Saturn, his plane lying between the ecliptic and those of the other satellites. Dr Herschel observes that the 5th satellite turns round its axis once, exactly in the time in which it revolves round the planet Saturn. In this respect it resembles our moon, which does the same thing. The proportional distances of the 5 satellites formerly known to astronomers are shewn in Plate XV. fig. 11.

(128.) The GEORGIVM SIDUS or HERSCHEL, being more remote than Saturn, is also less known. Its apparent magnitude is so small, that it can seldom be seen by the naked eye, and even when viewed by means of the telescope, it appears only a few seconds in diameter. This planet was discovered by Dr Herschel in 1781; and in 1783 he likewise discovered two satellites that revolve round it. They are probably not less than Jupiter's moons, and their orbits are nearly perpendicular to the ecliptic. This is a circumstance in which they differ from the attendants of all the other planets.

(129.) Their periods of revolution and angular distances from their primary are as follow :

| Satellite. | Periods. | Dist. |
|-------------------|-----------------|--------|
| 1 st . | 8d. 17h. 1' 19" | 0' 33" |
| 2 ^d . | 13 11 5 1½ | 0 44½ |

(130.) The COMETS, viewed through a telescope, have a very different appearance from any of the planets. The nucleus, or star, seems much dimmer. They are to appearance surrounded with atmospheres of a prodigious size, often rising ten times higher than the nucleus, and have often likewise different phases, like the moon.

(131.) The head of a comet, seen through a good telescope, appears to consist of a solid globe, and an atmosphere that surrounds it. The solid part is frequently called the *nucleus* ; which, through a telescope, is easily distinguished from the atmosphere or hairy appearance.

(132.) A comet is generally attended with a *head* or *tail*, whereby it is distinguished from a star or planet ; as it is also by its motion. Sometimes the tail only of a comet has been visible at a place where the head has been all the while under the horizon ; such an appearance is called a *comet*. As the tail of a comet is owing to the heat of the sun, it grows larger as the comet approaches near to, and shortens as it recedes from, the luminary.

(133.) If the tail of a comet were to continue the same length, it would appear longer or shorter, according to the different views of the spectator ; for if his eye be in a line, drawn through the middle of the tail lengthwise, or nearly so, the tail will not be distinguished from the rest of the atmosphere, but the whole will appear round ; if the eye be a little out of that line, the tail will appear short (see Plate XV. Fig. C.) ; and it is called a *bearded comet*, when the tail hangs down towards the horizon, as in that figure. If the head of a comet be viewed sidewise, the whole length of it is seen. It is obvious, that the nearer the eye is to the tail, the greater will be its apparent length.

(134.) The tails of comets often appear bent, (see Plate XXVIII. Fig. 8. 9.), owing to the resistance of the æther ; which, though extremely small, may have a sensible effect on so thin a vapour as the tail consists of. This bending is seen only when the earth is not in the plane of the orbit of the comet continued. When that plane passes through the eye of the spectator, the tail appears straight. See Plate XXVIII. Fig. 6. 7.

(135.) The FIXED STARS, when viewed through the best telescopes, appear not in the least magnified, but rather diminished, on account, as is thought by some, that the telescope takes off that twinkling appearance they make to the naked eye ; but by others more probably, that the telescope tube excludes a quantity of the rays of light, which are not only emitted from the particular stars themselves, but by many thousands of other particks about us, are reflected into our eyes so strongly as to excite vibrations, not only on

those points of the retina where the images of the stars are formed, but also in other points at the same distance round about. This without the telescope makes us imagine the stars to be much bigger than when we see them only by a few rays coming directly from them, so as to enter our eye without being intermixed with others.

(136.) The NUMBER of stars appears prodigiously increased through the telescope ; 70 stars have been counted in the constellation called *Pleiades*, and no fewer than 2000 in that of Orion. The late improvements of Herschel, however, have shown the number of stars to be exceedingly beyond even what the discoveries of former astronomers would induce us to suppose. He has also shown, that many, which, to the eye, or through ordinary glasses, appear single, do in fact consist of two or more stars ; and that the Galaxy or Milky Way owes its light entirely to multitudes of small stars placed so close, that the naked eye, or even ordinary telescopes, cannot distinguish them.

(137.) The NEBULÆ, or small whitish specks, discoverable by telescopes in various parts of the heavens, are owing to the same cause. Former astronomers could only reckon 103 ; but Herschel has discovered upwards of 1250. He has also discovered a species of them, which he calls *planetary nebulae*, on account of their brightness, and shining with a well-defined disk.

SECT. III. CONCLUSIONS drawn from the APPEARANCES of the SUN and PLANETS.

(138.) Various conjectures have been formed on the nature of the celestial bodies. ANAXIMANDER and ANAXIMENES held, that there was a circle of fire all along the heavens, which they called *the circle of the sun* ; between the earth and this fiery circle was placed another circle of some opaque matter, in which there was a hole like the mouth of a German flute ! Through this hole the light was transmitted, and appeared to the inhabitants of this earth as a round and distinct body of fire, and the eclipses of the sun were supposed to be occasioned by stopping this hole !

(139.) ANAXAGORAS held the sun to be a fiery globe of some solid substance, bigger than Peloponnesus ; and many of the moderns have adopted this notion, only increasing the magnitude of the globe prodigiously. Sir ISAAC NEWTON has proposed it as a query ; Whether the sun and fixed stars are not great *Earths* made vehemently hot, whose parts are kept from fuming away, by the vast weight and density of their superincumbent atmospheres, and whose heat is preserved by the prodigious action and re-action of their parts upon one another ? But, though he has proposed this as a query, and taken the existence of a solar atmosphere for granted ; there have yet been no proofs adduced in favour of that opinion besides those of analogy and probability.

(140.) There is, however, an appearance in the heavens, termed *femita luminosa*, or the ZODIACAL LIGHT, which is now generally supposed to be owing to the sun's atmosphere. This was first discovered by Cassini, in 1683. It is something like the Milky Way, a faint twilight, or the tail of a comet, thin enough to let stars be seen through it,

lous fluid; that this fluid is subject to ebbing and flowing, after the manner of our tides, so as sometimes to leave uncovered the tops of rocks or hills, which appear like black spots; and that the nebilities about them are caused by a kind of froth. Others have imagined, that the fluid which sends so much light and heat, contains a nucleus or solid globe, wherein are several volcanoes, which, like *Ætna* or *Vesuvius*, from time to time cast up quantities of bituminous matter to the surface of the sun; and form those spots which are seen there; and that as this matter is gradually consumed by the luminous fluid, the spots disappear for a time, but are seen to rise again in the same places when those volcanoes cast up new matter. A 3d opinion is, that the sun consists of a fiery luminous fluid, wherein are immersed several opaque bodies of irregular shapes; and that these bodies, by the rapid motion of the sun, are sometimes raised or raised up to the surface, where they form the appearance of spots, which seem to change their shapes according as different sides of them are presented to the view. A 4th opinion is, that the sun consists of a fluid in continual agitation; that, by the rapid motion of this fluid, some parts more gross than the rest are carried up to the surface of the luminary, like the scum of melted metal rising up to the top in a furnace: that these scums, as they are differently agitated by the motion of the fluid, form themselves into those spots we see on the solar disk; and, besides the optical changes already mentioned, grow larger, are diminished in their apparent magnitude, recede a little from, or approach nearer to, each other, and are at last entirely dissipated by the continual rapid motion of the fluid, or are otherwise consumed or absorbed.

(149.) Dr WILSON, in the 64th volume of the *Philosophical Transactions*, advances a new opinion, viz. that they are hollows in the surface of the luminary. On this supposition he offers some conjectures and conjectures concerning the nature of the sun himself. He asks, Whether it is not reasonable to think; that the vast body of the sun is made up of two kinds of matter very different in their qualities; that by far the greatest part is solid and dark; and that this dark globe is encompassed with a thin covering of that resplendent substance, from which the sun would seem to derive the whole of his vivifying heat and energy?

(150.) This, if granted, will afford a satisfactory explanation of the appearance of spots; because, if a part of this resplendent surface shall be by some means displaced, the dark globe must necessarily appear; the bottom of the cavity corresponding to the nucleus, and the shelving sides to the umbra. The shining substance, he thinks, may be displaced by the action of some elastic vapour generated within the substance of the dark globe. This vapour, swelling into such a volume as to push up to the surface of the luminous matter, would thereby throw it aside in all directions: and we cannot expect any regularity in the production of such a vapour, the irregular appearance and disappearance of the spots is by that means accounted for; as the reflux of the luminous matter must always occasion the dark nucleus gradu-

ally to decrease, till at last it becomes indistinguishable from the rest of the surface.

(151.) But an objection occurs, That, on this supposition, the nucleus of a spot, whilst on the decrease, should always appear nearly circular, by the gradual descent of the luminous matter from all sides to cover it. To this Dr Wilson replies, that in all probability the surface of the dark globe is very uneven and mountainous, which prevents the regular reflux of the shining matter: and this, he thinks, is rendered very probable by the enormous mountains and cavities which are observed in the moon; and why, says he, may there not be the same on the surface of the sun? He thinks his hypothesis also confirmed by the dividing of the nucleus into several parts, which might arise from the luminous matter flowing in different channels in the bottom of the hollow.

(152.) The appearance of the umbra after the nucleus is gone, he thinks, may be owing to a cavity remaining in the luminous matter, though the dark globe is entirely covered. As to a motion of the spots, distinct from what they are supposed to receive from the rotation of the sun round his axis, he says he never could observe any, except what might be attributed to the enlargement or diminution of them when in the neighbourhood of one another. "But (says he) what would farther contribute towards forming a judgment of this kind, is the apparent alteration of the relative place, which must arise from the motion across the disk on a spherical surface; a circumstance which I am uncertain if it has been sufficiently attended to."

(153.) Dr Wilson's hypothesis is further confirmed by the disappearance of the umbra on the sides of spots contiguous to one another; as the action of the elastic vapour must necessarily drive the luminous matter away from each, and thus as it were accumulate it between them, so that no umbra can be perceived. As to the luminous matter itself, he conjectures, that it cannot be any very ponderous fluid, but that it rather resembles a dense fog which broods on the surface of the sun's dark body.

(154.) Dr Wilson's general conclusion is, that, "According to the view of things given in the foregoing queries, there would seem to be something very extraordinary in the dark and unignited state of the great internal spot of the sun. Does not this, (he asks) seem to indicate that the luminous matter that encompasses it derives not its splendor from any intensity of heat? For, if this were the case, would not the parts underneath, which would be perpetually in contact with that glowing matter, be heated to such a degree as to become luminous and bright? At the same time it must be confessed, that although the internal globe was in reality much ignited, yet when any part of it forming the nucleus of a spot is exposed to our view, and is seen in competition with a substance of such amazing splendor, it is no wonder that an inferior degree of light, should in these cases, be unperceivable.

(155.) "In order (continues the Doctor) to obtain some knowledge of this point, I think an experiment might be tried, if we had an opportuni-

en total eclipses the moon is still visible, appearing of a dull red colour, as if obscured by a great deal of smoke. In reply to this it hath been advanced, that this is not always the case; the moon sometimes disappearing totally in the time of an eclipse, so as not to be discernible by the best glasses, while little stars of the fifth and sixth magnitudes were distinctly seen as usual; and when the moon is visible in a total eclipse, a sufficient reason may be assigned for this appearance from the refraction of the sun's rays through our atmosphere, which are reflected back to the earth from the otherwise dark surface of the moon.

(160.) Various speculations have also been indulged concerning the spots on the moon's surface. Some philosophers have been so taken with the purity of the brightest places observed in her disk, that they have imagined them to be rocks of diamonds; and others have compared them to pearls and precious stones. Keill and the greater part of astronomers are now of opinion, that these are only the tops of mountains, which by reason of their elevation are more capable of reflecting the sun's light than others which are lower. The dusky spots, he says, cannot be seas, nor any thing of a liquid substance; because, when examined by the telescope, they appear to consist of an infinity of caverns and empty pits, whose shadows fall within them, which can never be the case with seas, or any liquid substance; but, even within these spots, brighter places are also to be observed; which, according to his hypothesis, ought to be the points of rocks standing up within the cavities. Dr Long, however, is of opinion, that several of the dark spots on the moon are of water.

(161.) It has been a matter of dispute whether the moon has any atmosphere or not. The following arguments have been urged on the negative side: 1. The moon constantly appears with the same brightness where there are no clouds in our atmosphere; which could not be the case, if she were surrounded with an atmosphere like ours, variable in its density, and so frequently obscured by clouds and vapours. 2. In an appulse of the moon to a star, when she comes so near it that a part of her atmosphere is interposed between our eye and the star, refraction would cause the latter to seem to change its place; so that the moon would appear to touch it later than by her true motion she would do. 3. Some philosophers are of opinion, that because there are no seas on the moon, there is therefore no atmosphere, as there is no water to be raised up in vapours.

(162.) To these arguments, it has been replied; that the moon does not always appear with the same brightness, even when our atmosphere appears perfectly clear. Hevelius relates, that he has several times found in skies perfectly clear, when even stars of the 6th and 7th magnitude were visible, that at the same altitude of the moon, and the same elevation from the earth, and with one and the same telescope, the moon and its maculæ do not appear equally lucid, clear, and conspicuous at different times; but are much brighter and more distinct some times than at others. From the circumstances of this observation, say they, it is evident

that the reason of this phenomenon is neither in our air, in the tube, in the room, nor in the spectator's eye; but must be looked for in something existing about the moon. An additional argument is drawn from the different appearances of the moon in total eclipses, which are supposed to be owing to the different constitutions of the lunar atmosphere.

(163.) II. To the 2d argument, Dr Long replies, that Sir Isaac Newton has shown, that the weight of any body upon the moon is but a third part of what the weight of the same would be upon the earth: now the expansion of the air is reciprocally as the weight that compresses it; the air, therefore, surrounding the moon, being pressed together by a weight, or being attracted towards the centre of the moon, by a force equal only to one third of that which attracts our air towards the centre of the earth, it follows, that the lunar atmosphere is only one third as dense as that of the earth, which is too little to produce any sensible refraction of the stars' light. Other astronomers have contended, that such refraction was sometimes very apparent. Cassini says, that he frequently observed Saturn, Jupiter, and the fixed stars to have their circular figure changed into an elliptical one, when they approached either to the moon's dark or illuminated limb; though they own, that in other occultations no such change could be observed. With regard to the fixed stars, indeed, it has been urged, that, granting the moon to have an atmosphere of the same nature and quantity as ours, no such effect as a gradual diminution of light ought to take place; at least, that we could by no means be capable of perceiving it. Our atmosphere is found to be so rare at the height of 44 miles, as to be incapable of refracting the rays of the light. This height is the 120th part of the earth's diameter; but since clouds are never observed higher than four miles, we must conclude, that the vaporous or obscure part is only the 1980th. The mean apparent diameter of the moon is $31' 29''$, or 1889 seconds: therefore the obscure parts of her atmosphere, when viewed from the earth, must subtend an angle of less than one second; which space is passed over by the moon, in less than two seconds of time. It can therefore hardly be expected that observation should generally determine whether the supposed obscuration takes place or not.

(164.) III. The 3d argument is necessarily inconclusive, because we know not whether there is any water in the moon or not; nor, though this could be demonstrated, would it follow, that the lunar atmosphere answers no other purpose than the raising of water into vapour.

(165.) IV. There is, besides, a strong argument in favour of the existence of a lunar atmosphere, taken from the appearance of a luminous ring round the moon in the time of solar eclipses; a circumstance frequently observed by astronomers, particularly in the *total eclipse* of the sun in 1706, and in another total eclipse of the sun, in April 1715, certain streaks of light were seen to dart from different places of the moon, during the time of total darkness. These were imagined to be flashes of lightning, and hence the existence of

the dark and superstitious ages, they were held to be the forerunners of every kind of calamity, and were supposed to have different degrees of dignity according to the shape they assumed; from whence also they were differently denominated. Thus, some were said to be *bearded*, some *serpentine*; some to represent a *beam*, *sword*, or *spear*; others a *target*, &c.; whereas modern astronomers acknowledge only one species of comets, and account for their different appearances, from their different situations and distances from the sun and earth.

(176.) KEPLER, in other respects a very great genius, indulged the most extravagant conjectures, not only concerning comets, but the whole system of nature. The planets he imagined to be huge animals, who swam round the sun by means of certain fins acting upon the ethereal fluid as those fishes do on the water: and agreeable to this notion, he imagined the comets to be monstrous and uncommon animals generated in the celestial spaces; and he explained how the air engendered in them by an animal faculty!

(177.) JOHN BODIN, a learned Frenchman of the 16th century, entertained an opinion, if possible, still more ridiculous. He maintained that comets "are *spirits* which having lived on the earth innumerable ages, and being at last arrived to the confines of death, celebrated their last triumph, or are recalled to the firmament like shining stars! This is followed by famine, plague, &c. until the people destroy the governors and chiefs to appease the wrath of God!"

(178.) Others have denied even the existence of comets, and maintained that they were only false appearances occasioned by the refraction or reflection of light. The first rational conjecture among the moderns we meet with is that of James Hououilli, who imagined them to be the satellites of some very distant planet, which was invisible to us on account of its distance, as were also the satellites, unless when in a certain part of their orbit.

(179.) The first astronomer who restored the comets to their true rank in the creation, was TYCHO BRAHE. Before his time several had been observed with tolerable exactness by Regiomontanus, Appian, Fabricius, and others; yet they were thought to be below the moon. But Tycho, being provided with much better instruments, set himself with great diligence to observe the famous comet of 1577; and from many careful observations deduced that it had no sensible diurnal parallax; and therefore was not only far above the region of our atmosphere, but much higher than the moon. But though few have come so near the earth as to have any diurnal parallax, all of them have what may be called an annual parallax; that is, the revolution of the earth in her orbit makes their apparent motion to be very different from what it would be if viewed from the sun: and this shows them to be much nearer than the fixed stars, which have no such parallax. Kepler, the disciple of Tycho, was also very attentive to the motions of the comets, and found that they did not move in straight lines, as had been supposed. He showed that their paths were concave

towards the sun, and supposed them to move in parabolic trajectories.

(180.) Sir ISAAC NEWTON at last discovered their true motion, from the observations he made on the great comet of 1680. This descended almost perpendicularly towards the sun with a prodigious velocity; ascending again with a motion retarded, as much as it had been before accelerated. It was seen in the morning by a great number of astronomers in different parts of Europe, from the 4th to the 25th of November, in its way toward the sun; and in the evening from the 12th of December to the 9th of March following. The many exact observations made on this comet enabled Sir Isaac Newton to determine, that they are a kind of planets, which move in very excentric ellipses; and this opinion is now considered as an established truth.

(181.) It has been remarked that a greater number of comets is seen in the hemisphere towards the sun than in the opposite; the reason of which will easily appear from fig. 5. Plate XV. wherein S represents the sun, E the earth, A B C D the sphere of the fixed stars; and because comets neither reflect light enough to be visible, nor emit tails conspicuous enough to attract our notice, till they come within the planetary regions, commonly a good way within the sphere of Jupiter, let K L M N be a sphere concentric to the sun, at such a distance from him, that no comet can be seen by us till it come within that distance; through E draw the plane B D perpendicular to S E, which will divide the sphere K L M N into two hemispheres, one of which, B C D, is toward the sun, the other D A B, opposite. Now it is manifest, that the spherical portion L M N, which is in the hemisphere B C D toward the sun, is larger than the portion N K L in the hemisphere opposite to him; and consequently a greater number of comets will appear in the hemisphere B C D than in that marked D A B.

(182.) Although the orbs of all comets are very excentric ellipses, there are vast differences among them. Excepting Mercury, there are no great differences among the planets either as to the excentricity of their orbits, or the inclination of their planes; but the planes of some comets are almost perpendicular to others, and some of their ellipses are much wider than others. The narrowest ellipsis of any comet hitherto observed was that of 1680. There is also a much greater inequality in the motion of the comets than of the planets; the velocity of the former being incomparably greater in their perihelion than in their aphelion; but the planets are but very little accelerated.

(183.) It is now the general opinion of astronomers, that comets are opaque bodies enlightened by the sun. Hevelius, in a large work, wherein he gives the opinions of various authors on the subject, mentions some who were of the same sentiments with himself, that comets were so far transparent as to let the light of the sun pass through them, which formed their tails. Sir Isaac Newton was of opinion, that they are quite-opaque; and in confirmation of this, he observes, that if a comet be seen in two parts of its orbit,

count for the vast lengths of the tails of some comets, which have been said to measure above 80 millions of miles.

(192.) M. EULER thinks there is a great affinity between the tails of the comets, the zodiacal light, and the aurora borealis; and that the common cause of them all is the action of the sun's light on the atmospheres of the comets, of the sun, and of the earth. He supposes, that the impulse of the rays of light, on the atmosphere of comets, may drive some of its finer particles far beyond the limits of that atmosphere, and that this force of impulse combined with that of gravity towards the comet, would produce a tail, which would always be in opposition to the sun, if the comet did not move. But the motion of the comet in its orbit, and about its axis, must vary the position and figure of the tail, giving it a curvature and deviation from the right line joining the centre of the sun and comet, which deviation will be greater as the orbit of the comet has the greater curvature, and as its motion is the more rapid. The velocity of the comet in its perihelion may be so great that the force of the solar rays may produce a new tail before the old one can follow. The possibility of this was confirmed by the comet of 1744, which had several tails while it was in its perihelion.

(193.) The resemblance between the tails of comets and the aurora borealis, which is commonly considered as an electrical phenomenon, has suggested an opinion far from being improbable, that the tails of comets are streams of electric matter. HAMILTON, in a small treatise, intitled, *Conjectures on the Nature of the Aurora Borealis, and on the Tails of Comets*, supposes that the comets are of use to bring back the electric fluid to the planets, which is continually discharged from the higher regions of their atmospheres.

(194.) The near approach of some comets to the sun subjects them to intense and inconceivable degrees of heat. Newton calculated that the heat of the comet of 1680 must have been near 2000 times as great as that of red-hot iron. The calculation is founded upon this principle, that the heat of the sun falling upon any body at different distances is reciprocally as the squares of those distances; but it may be observed, that the effect of the heat of the sun upon all bodies near our earth depends very much on the constitution of those bodies, and of the air that surrounds them.

(195.) Mr WHISTON, from Flamsteed's measure of its apparent diameter, concluding the nucleus of the comet to be about ten times as big as the moon, or equal to a 4th part of the earth, attributes the universal deluge to the near approach thereof. His opinion was, that the earth passing through the atmosphere of the comet, attracted from great part of the water of the flood; that the nearness of the comet raised a great tide in the subterraneous waters, so that the outer crust of the earth was changed from a spherical to an oval figure; that this could not be done without making fissures and cracks in it, through which the waters forced themselves, by the hollow of the earth being changed into a less capacious room; carrying along with them trees, animals, fishes, &c. the bones, shells, and other relics,

which are often found at great depths in the earth. The same comet, he thought, would probably, coming near the earth when heated in an immense degree in its perihelion, be the instrumental cause of that great catastrophe, the general conflagration, foretold in the sacred writings, and conjectured from ancient tradition.

(196.) The analogy discovered by Kepler, between the periodical times of the planets and their distances from the sun, takes place also in the comets. In consequence of this, the mean distance of a comet from the sun may be found by comparing its period with the time of the earth's revolution round the sun. Thus the period of the comet that appeared in 1531, 1607, 1682, and 1759, being about 76 years, its mean distance from the sun may be found by this proportion: As 1, the square of one year, the earth's periodical time, is to 5776 the square of 76, the comet's periodical time; so is 1,000,000, the cube of 100, the earth's mean distance from the sun, to 5,776,000,000, the cube of the comet's mean distance. The cube root of this last number is 1794; the mean distance itself in such parts as the mean distance of the earth from the sun contains 100. If the perihelion distance of the comet, 58, be taken from 3588 double the mean distance, we shall have the aphelion distance, 3530, of such parts as the distance of the earth contains 100; which is a little more than 35 times the distance of the earth from the sun. By a like method, the aphelion distance of the comet of 1680 comes out 138 times the mean distance of the earth from the sun, supposing its period to be 575 years: so that this comet, in its aphelion, goes more than 14 times the distance from the sun that Saturn does. Euler computes the orbit of this comet from three of Flamsteed's observations taken near together, compared with a fourth taken at some distance from the other three; and from thence concludes the period to be a little more than 170 years.

(197.) The period of the comet of 1744 is much longer than even that of 1680. BETTS, in attempting to compute the transverse axis of its orbit, found it come out so near infinite, that, though the orbit showed itself in this manner to be a very long one, he found it impossible to calculate it without some observations made after its perihelion. Dr HALLEY, after he had finished his tables of comets, found such a similitude in the elements of those of 1531, 1607, and 1682, that he was induced to believe them to be returns of the same comet in an elliptic orbit: but as there was such a difference in their periodical times and inclinations of their orbits as seemed to make against this opinion; and as the observations of the first of them in 1531 by Appian, and the 2d in 1607 by Kepler, were not exact enough to determine so nice a point when he first published his synopsis in 1705; he only mentioned this as a thing probable, and recommended it to posterity to watch for an appearance of the same in 1758.

(198.) Dr HALLEY, looking over the catalogue of ancient comets, and finding three others at equal intervals with those now mentioned, afterwards grew more positive in his opinion; and knowing a method of calculating with ease a motion in an elliptic orbit, how excentric soever it might

might be, instead of the parabolic orbit which he had given for the comet of 1681, he set about adapting the plan of that orbit to an ellipsis of a given space and magnitude, having the sun in one of its foci, so as to tally with the observations of that comet made by Flamsteed with great accuracy, by the help of a very large sextant. He likewise corrected the places of the comet of 1551 from Appian, and those of the comet of 1607 from Kepler and Longomontanus, by rectifying the places of the stars they had made use of, and found those places agree as well with the motion in such an ellipsis as could be expected from the manner of observing of these astronomers, and the imperfections of their instruments.

(199.) The greatest objection to this theory was some difference in the inclination of the orbits, and that there was above a year's difference between the two periods. The comet of 1531 was in its perihelion August 24; that of 1607, October 16; and that of 1681, September 4: so that the first of these periods was more than 76, the latter not quite 75 years. To obviate this, he reminds his readers of an observation made by him of the periodical revolution of Saturn having at one time been about 13 days longer than at another time; occasioned, as he supposed, by the near approach of Saturn and Jupiter, and the mutual attraction and gravitation of the two planets: and observes, that in the summer 1681, the comet in its descent was for some time so near Jupiter, that its gravitation towards that planet was one 50th part of its gravitation towards the sun. This he concluded, would cause a change in the inclination of its orbit, and also in the velocity of its motion: for by continuing longer near the planet Jupiter on the side most remote from the sun, its velocity would be more increased by the joint forces of both those bodies, than it would be diminished by them acting contrarywise, when on the side next the sun where its motion was swiftest. The projectile motion being thus increased, its orbit would be enlarged, and its period lengthened; so that he thought it probable it would not return till after a longer period than 76 years, about the end of the year 1758 or beginning of 1759.

(200.) DR HALLEY having expressed his opinion modestly, though clearly enough, that this comet would appear again about the end of 1758, or the beginning of the following year, DE LA LANDE alledged he must have been at a loss to know whether the period he foretold would have been of 75 or 76 years; that he did not give a decisive prediction, as if it had been the result of calculation; and that by considering the affair in so loose a manner as Halley did, there was a good deal of room for objecting to his reasoning.

(201.) M. DE LA LANDE is very full in his commendation of the performance of Clairault; who, he says, not only calculated strictly the effect of the attraction of Jupiter in 1681 and 1683, when the comet was again near Jupiter, but did not neglect the attraction of that planet when the comet was most distant; that he considered the uninterrupted attractions of Jupiter and Saturn upon the sun and upon the comet, but chiefly the attractions of Jupiter upon the sun, whereby that luminary was a little displaced, and gave different

elements to the orbit of the comet. By this method he found the comet would be in its perihelion about the middle of April; but that, on account of some small quantities necessarily neglected in the method of approximation made use of by him, Clairault desired to be indulged a month, and that the comet came just 30 days before the time he had fixed for its appearance.

(202.) It seems evident, indeed, from the instance just mentioned, that comets may have their motion disturbed by the planets, especially by the two largest, Jupiter and Saturn. They may also affect one another by their mutual gravitation when out of the planetary regions; but of this we can take no account, nor can we estimate the resistance of the ether through which they pass; and yet both these causes may have some influence on the inclination of their orbits and the length of their periods.

SECT. V. CONJECTURES and CONCLUSIONS respecting the FIXED STARS.

(203.) Astronomers have supposed the innumerable multitude of fixed stars to be so many suns, each of which is attended by a certain number of planets or habitable worlds like our own, as well as visited by comets. The strongest argument for this hypothesis is, that the stars cannot be magnified by a telescope on account of their immense distance; whence we must conclude they shine by their own light, and are therefore so many suns; each of which we may suppose to be equal, if not superior, in lustre and magnitude to our own. They are not supposed to be at equal distances from us, but to be more remote in proportion to their apparent smallness. This supposition is necessary to prevent any interference of their planets; and thus there may be as great a distance between a star of the first magnitude and one of the second apparently close to it, as between the earth and the fixed stars first mentioned.

(204.) Others object, that the disappearance of some of the fixed stars is a demonstration that they cannot be suns, as it would be to the highest degree absurd, to think that God would create a sun which might disappear of a sudden, and leave its planets and their inhabitants in endless night. But this argument will have no weight with those who believe in the doctrines of revelation; who assure us, that our world will come to an end, and that our sun will be deprived of his light, and consequently that all the planets, which circulate around him, will be involved in darkness.

(205.) In short, there is nothing inconsistent with either scripture or reason, in supposing, that while infinite space is universally filled with illuminating suns, and circulating planets, each world, or rather each *solar system* of worlds, has its own periods of creation, duration and final corruption; as we are assured ours has had, and will have. And the discoveries of astronomers respecting old stars disappearing, and new ones being observed, are perfectly consistent with the doctrine of creation and dissolution, which all Christians profess to believe, with regard to our own system and the globe we inhabit: (See a hint respecting the creation of other worlds, under ANGELS, § 6.) They seem to afford, likewise, a

pretty strong argument against the theories of Dr TOULMIN and other philosophers, who plead for the *eternity of the world, and of the universe.*

(106.) Some, however, have thought that the variable stars which disappear for a time, were planets, which were only visible during some part of their course. But this, their apparent immobility, notwithstanding their decrease of lustre, will not allow us to think. Some have imagined, that one side of them might be naturally much darker than the other, and when, by the revolution of the star upon its axis, the dark side was turned towards us, the star became invisible, and for the same reason, after some interval, resumed its former lustre.

(107.) M. MAUPERTUIS is of opinion that some stars, by their prodigious quick rotations on their axis, may not only assume the figures of oblate spheroids, but that, by the great centrifugal force arising from such rotations, they may become of the figures of mill-stones, or be reduced to flat circular planes, so thin as to be quite invisible when their edges are turned towards us; as Saturn's ring is in such positions. But when very eccentric planets or comets go round any flat star, or orbits much inclined to its equator, the attraction of the planets or comets in their perihelions must alter the inclination of the axis of that star; which account it will appear more or less large and luminous, as its broad side is more or less turned towards us. And thus he imagines we may account for the apparent changes of magnitude and lustre in those stars, and likewise for their appearing and disappearing.

(108.) Mr Dun, in a dissertation concerning the apparent increase of magnitude in the heavenly bodies when they approach the horizon, inserted in the *LIII* vol. of the *Philosophical Transactions*, conjectures that the interposition of some of our atmosphere may solve the phenomena both of nebulous and new stars.

(109.) In the same work for 1783, however, MICHELL, in proposing a method to determine the distance, magnitude, &c. of the fixed stars, and the diminution of the velocity of their light, should any such thing be discovered, supposes that for the greater part, if not all of them, are systems of stars so near each other, as probably to be liable to be affected sensibly by their mutual gravitation; and that it is therefore not unlikely, at the periods of the revolutions of some of these about their principals (the smaller ones being, upon this hypothesis, to be considered as satellites to the others) may some time or other be discovered.

(110.) HERSCHEL, improving on Michell's idea of the fixed stars being collected into groups, and assisted by his own observations with the extraordinary telescopic powers already mentioned, has suggested a theory concerning the construction of the universe entirely new and singular. It had been the opinion of former astronomers, that our sun, besides occupying the centre of the system which properly belongs to him, occupied also the centre of the universe: but Herschel is of a different opinion.

(111.) "Hitherto (says the Dr) the sidereal heavens have, not inadequately for the purpose de-

signed, been represented by the concave surface of a sphere, in the centre of which the eye of the observer might be supposed to be placed. It is true, the various magnitudes of the fixed stars even then plainly suggested to us, and would have better suited, the idea of an expanded firmament of three dimensions; but the observations upon which I am now going to enter, still farther illustrate and enforce the necessity of considering the heavens in this point of view. In future therefore we shall look upon those regions into which we may now penetrate by means of such large telescopes, as a naturalist regards a rich extent of ground or chain of mountains, containing strata variously inclined and directed, as well as consisting of very different materials. A surface of a globe or map therefore will but ill delineate the interior parts of the heavens."

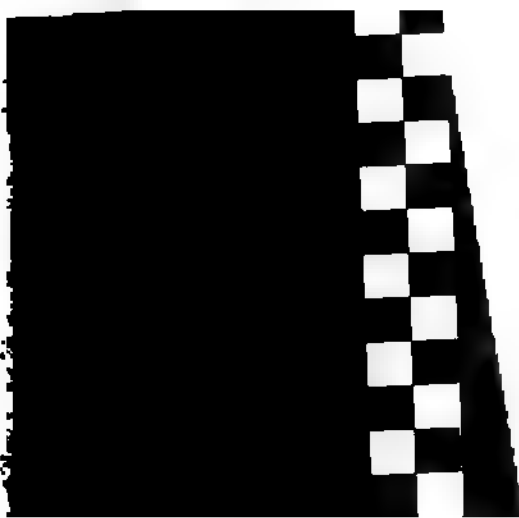
(112.) Dr HERSCHEL's observations, on which this theory is founded, were made with a Newtonian reflector of 20 feet focal length, and an aperture of 18 inches. With this powerful telescope, he first began to survey the Via Lactea, and found that it completely resolved the whitish appearance into stars, which the telescopes he formerly used had not light enough to do. The portion he first observed was that about the hand and club of Orion; in which he found an astonishing multitude of stars, whose number he endeavoured to estimate by counting many *fields*, (or *apparent spaces* of the heavens, which he could see at once through his telescope,) and computing from a medium of these how many might be contained in a given portion of the Milky Way. In the most vacant place to be met with in that neighbourhood, he found 63 stars; other 6 fields contained 110, 60, 70, 90, 70, and 74 stars; a medium of all which gave 79 for the number of stars to each field.—Thus he found, that by allowing 15' for the diameter of his field of view, a belt of 15° long and 2° broad, which he had often seen pass before his telescope in an hour's time, could not contain less than 50,000 stars, large enough to be distinctly numbered; besides which, he suspected twice as many more, which could be seen only now and then by faint glimpses for want of sufficient light.

(113.) The Doctor's success within the Milky Way soon induced him to turn his telescope to the nebulous parts of the heavens, of which an accurate list had been published in the *Connoissance des Temps* for 1783 and 1784. Most of these yielded to a Newtonian reflector of 20 feet focal distance and 12 inches aperture; which plainly discovered them to be composed of stars, or at least to contain stars, and to shew every other indication of consisting of them entirely.

(114.) "The nebulae (says he) are arranged into strata, and run on to a great length; and some of them I have been able to pursue, and to guess pretty well at their form and direction. It is probable enough, that they may surround the whole starry sphere of the heavens, not unlike the Milky Way, which undoubtedly is nothing but a stratum of fixed stars; and as this latter immense starry bed is not of equal breadth or lustre in every part, nor runs on in one straight direction, but is curved, and even divided into two streams along a very considerable portion of it; we may like-

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only a group of stars or suns with their planets, constituting one of those patches called a *nebula*, and perhaps not one ten thousandth part of what is really the universe, he goes on to delineate the re of this vast nebula, which he is of opinion (now he done; and for this purpose, he gives ble, calculating the distance of the stars which n its extreme boundaries, or the length of the ul ray in different parts, by the number of a contained in the field of his telescope at dif- ferent times. He then proceeds to offer some lights on the origin of the nebulous strata of heavens; in doing which, he gives some hints seeming the antiquity of them.

232.) "If it were possible, (says he) to di- vidual between the parts of an indefinitely ex- tended whole, the nebula we inhabit might be d to be one that has fewer marks of antiquity an any of the rest. To explain this idea, per- haps more clearly, we should recollect, that the misdivision of clusters of stars has been affir- med to a gradual approach, and whoever reflect- s the number of ages that must have passed, be- fore some of the clusters that are to be found in y intended catalogue of them could be so far extended as we find them at present, will not- withstanding, if I ascribe a certain age of youth and vigour, to many very regularly scattered regions of our sidereal stratum. There are, moreover, many places in it, in which, if we may judge from appearances, there is the greatest reason to believe, that the stars are drawing towards sec- ondary centres, and will in time separate into clus- ters, so as to occasion many subdivisions.

233.) "Hence we may surmise, that when a nebulous stratum consists chiefly of nebulae of the first and second forms, it probably owes its origin to what may be called the decay of a great com-



visual ray does not graze along the side, the straggling stars will of course be very few in number; and therefore, the ground of the heavens will assume that purity which I have always observed to take place in those regions."

(237.) Dr HERSCHEL here applies the name of *poles* to those points which are 90° distant from a circle passing along the Milky Way. The north pole is situated in R. A. 186° , and distant from the pole of the world 58° .

(238.) According to Herschel, then, the universe consists of *nebulae*, or innumerable collections of innumerable stars, each individual of which, is a sun not only equal, but much superior to ours: and none of the celestial bodies in our nebula are nearer to one another than we are to Sirius, whose distance is supposed not to be less than 400,000 times that of the sun from us, or 38 millions of millions of miles. The whole extent of the nebula being in some places near 50 times as great, must be such, that the light of a star placed at its extreme boundary, supposing it to fly with the velocity of 12 millions of miles every minute, must have taken near 3000 years to reach us. Herschel, however, is by no means of opinion, that our nebula is the most considerable in the universe.

(239.) "As we are used (says he) to call the appearance of the heavens, where it is surrounded with a bright zone, the *Milky Way*, it may not amiss to point out some other very remarkable nebulae, which cannot well be less, but are probably much larger, than our own system; and being also extended, the inhabitants of the planets that attend the stars which compose them, must likewise perceive the same phenomena; for which reason, they may also be called *Milky Ways*, for distinction's sake. My opinion of their size is founded on the following observations: There are many round nebulae of the first form, of about five or six minutes in diameter, the stars of which I can see very distinctly; and on comparing them with the visual ray calculated from the use of my long gauges, I suppose by the appearance of the small stars in those gauges, that the centres of these round nebulae may be 600 times the distance of Sirius from us."

(240.) He then tells us, that the stars in such nebulae, are probably twice as much condensed as those of our system; otherwise, the centre of it could not be less than 6000 times the distance of Sirius from us; and that it is possibly much underrated, by supposing it only 600 times the distance of that star.

(241.) "Some of these round nebulae (says Herschel) have others near them, perfectly similar in form, colour, and the distribution of stars, but of only half the diameter: and the stars in them seem to be doubly crowded, and only at about half the distance from each other. They are indeed so small, as not to be visible without the most attention. I suppose these miniature nebulae to be at double the distance of the first."

(242.) "An instance equally remarkable and instructive is, a case where, in the neighbourhood of two such nebulae as have been mentioned, I find with a third similar, resolvable, but much smaller and fainter nebula. The stars of it are no

longer to be perceived; but a resemblance of colour with the former two, and its diminished size and light, may well permit us to place it at full twice the distance of the second, or about four or five times the distance of the first. And yet the nebosity is not of the milky kind; nor is it so much as difficultly resolvable or colourless. Now in a few of the extended nebulae, the light changes gradually, so as from the resolvable to approach to the milky kind; which appears to me an indication, that the milky light of nebulae is owing to their much greater distance. A nebula, therefore, whose light is perfectly milky, cannot well be supposed to be at less than 6,000 or 8,000 times the distance of Sirius; and though the numbers here assumed are not to be taken otherwise than as very coarse estimates, yet an extended nebula, which in an oblique situation, where it is possibly fore-shortened by one half, two 3ds, or three 4ths of its length, subtends a degree or more in diameter, cannot be otherwise than of a wonderful magnitude, and may well outvie our Milky Way in grandeur."

(243.) After giving an account of several remarkable nebulae, Dr Herschel concludes thus: "Now, what great length of time must be required to produce these effects (the formation of nebulae) may easily be conceived, when, in all probability, our whole system, of about 800 stars in diameter, if it were seen at such a distance, that one end of it might assume the resolvable nebosity, would not, at the other end, present us with the irresolvable, much less with the colourless and milky nebosity." Great, indeed, must be the length of time, requisite for such distant bodies to form combinations by the laws of attraction, since, according to the distances he has assumed, the light of some of his nebulae must be 36,000 or 48,000 years in arriving from them to us. It would be worth while then to enquire, whether *attraction* is propagated in time or not; or whether it moves quicker or slower than light?

(244.) An objection naturally occurred, in the course of Herschel's observations and enquiries concerning the structure of the heavens, that if the different systems were formed by the mutual attractions of the stars, the whole would be in danger of destruction by the falling of them one upon another. A sufficient answer to this, he thinks, is, that if we can really prove the system of the universe to be what he has said, there is no doubt that the great Author of it has amply provided for the preservation of the whole, though it should not appear to us in what manner this is effected.

(245.) Several circumstances, however, he says, manifestly tend to a general preservation. The indefinite extent of the federal heavens, must produce a balance that will effectually secure all the great parts of the whole from approaching to each other. "There remains then, (says he) only to see how the particular stars belonging to separate clusters are prevented from rushing on to their centres of attraction." This he supposes may be done by PROJECTILE FORCES; "the admission of which will prove such a barrier against the seeming destructive power of attraction, as to secure from it all the stars belonging to a cluster,

if not for ever, at least for millions of ages. Be-
lieving, we might perhaps to look upon such clus-
ters, and the distribution of a star now and then
in some thousands of ages, as the very means by
which the whole is preserved and renewed. There-
fore it may be the laboratory of the universe,
in the most salutary remedies for the decay
of the whole are prepared.

(25.) The existence of such projectile forces
is rendered probable, from the apparent changes
of position of certain stars, and from a compari-
son of the most accurate observations with the most
accurate of former times, there appears to have
been a real change, in the places of some of them.
The *Bull's Eye*, *Sagittæ*, and *Arcturus*, are now
found to be half a degree more southerly than the
ancients reckoned them, and the bright star in the
shoulder of *Orion*, *β*, in *Ptolemy*, almost a
whole degree of latitude more southerly than at
present. Dr. Herschel has lately observed, that
the distance and position of the two stars, *γ* and *δ*,
forming the double star, *1 Draconis*, is different from
what it was a few hundred years. So considerable
is the change of distance, (for it is $16^{\circ} 6'$) that
he thinks we can hardly account for it otherwise,
than by admitting a proper motion in the case of
either of the stars, or in our solar system, most
probably, he says, neither of the three is at rest.
(26.) If our solar system do really change its
place in absolute space, it promises of time, an
apparent change in the angular distances of some
of the fixed stars will appear, and the nearest be-
ing more altered than such as are more remote,
their relative positions may seem to alter, although
the stars were really immovable, and *our system*
we may surmise, from the observed motions of
the stars, that our system, with all its planets and
comets, may have a motion towards some particu-
lar part of the heavens, on account of a greater
quantity of matter collected in a number of
stars, and their being nearer places there situated,
which may occasion a less attraction of our whole
solar system towards it. On the other hand, if
our system be at rest, and any of the stars really
in motion, this might likewise vary their apparent
position, and the more so, the nearer they are to
us, or the more in their motions are, or the more
proper the direction of the motion is, to be re-
markably perceptible by us.

PART II

OF THE VARIOUS SYSTEMS OF ASTRO-
NOMY.

SECT. I. Of the MOST ANCIENT SYSTEMS, by
which the MOTIONS OF THE HEAVENS have been
ATTEMPTED TO BE EXPLAINED.

§ 1. To explain the motions and appearances
of the heavenly bodies, various hypotheses have
been proposed, and every hypothesis that ever was
proposed, was either for the sake of order, or for the
sake of simplicity, or for the sake of the agreement
of the system with the observations. It is not
likely that any one could not see in a moment, that
they could not be true, if they were to explain all
the various phenomena of the celestial world.
In treating of these various systems which
have been proposed, we shall not only see what
they were, but also what they are, and what they

mean to give an account of the various appearances
that have been traced by individuals in the
subject; but shall confine ourselves to those systems
which have been of considerable note, and have
generally followed for a number of years. Con-
sidering the opinions of the very first astronomers
about the system of nature, we are as ignorant
as we are of these astronomers themselves. The
ever opinions are handed down to us, and they
are a vastly later date than the introduction of the
system among mankind.

(27.) If we may hazard a conjecture, however,
we are inclined to think, that the first opinions
about this subject were much more just, than those
which were held afterwards for many years. Pro-
phecy was maintained the motion of the earth, which
is now universally believed, but at that time
appears to have been the opinion of only a few
individuals of Greece. As the Greeks re-
ceived many things from the Egyptians, and the
Babylonians had travelled into Egypt and Persia,
it is probable he might receive an account of the
system from thence, but whether he did or not,
we have now no means of knowing, and it is
not of any importance. Certain it is, however,
that this opinion did not prevail in the world
for many ages afterwards.

(28.) In the 6th century the very error of
Pythagorean hypothesis was supported by the
system erected by the famous geographer and
astronomer, CLAUDIUS PTOLEMY. The system
which commonly goes by the name of the
Ptolemaic, he seems not to have originally
adopted as the prevailing one of his time,
which was a cubic form, and was the best of
them it was before. He supposed the earth
in the centre of the universe. Round the
earth, and the nearest to it of all the heavenly
bodies, the moon performed its monthly revolution
to the moon was placed the planet Mercury,
Venus, and above that the Sun, Mars, Ju-
piter, and Saturn, in their proper orbits, those
of the fixed stars; above these, two spheres
he called *crystalline heavens*; above these the
primum mobile, which, by turning round
in 24 hours, by some unaccountable means, was
carried along with it. The primum mobile
was encompassed by the crystalline sphere,
which was a cubic form, and was the best of
them it was before. Besides the motions of the
heavens round the earth, once in 24 hours,
the planet was supposed to have a particular
motion of its own; the moon, for instance, once in
a month, and the other planets, once in their
year, &c. See Plate XV. fig. 1.
(29.) It is evident, that on this hypothesis
the confused motions of the planets already
could never be accounted for. Had the earth
moved uniformly round the earth, the system
motion might always to have been seen, and
without appearing either known or
suspected in any part of their course. In the
system of the earth, the planets were supposed
to move in great numbers of circles, moving
each other, which he called *epicycles*, and called
them *epicycles*. A self-proved a ready and elegant
method of the system; and which was de-
vised from the cause it ought to be.

to have followed; it was then only moving in an epicycle or an excentric, and would in due time fall into its proper path. As to the natural causes, by which the planets were directed to move in these epicycles and excentrics, it is no wonder that he found himself much at a loss, and was obliged to have recourse to divine power for an explanation, or, in other words, to own that his system was unintelligible. This system continued to be in vogue till the beginning of the 16th century, when it was superseded by the **COPERNICAN**, of which afterwards.

(253.) The only other systems, worth mentioning, besides the true system, are the *Tychonic*, the *Semi-Tychonic* and the *Cartesian*; all of which have gained profelytes, though none of them were ever so universally received, as the Ptolemaic and Copernican.

(254.) The **TYCHONIC SYSTEM**, Plate XV. fig. 6. was invented by **TYCHO BRAHE**, who supposed the earth absolutely at rest, and that the moon and sun revolved about the earth; the moon in a month, and the sun in a year; and at the same time, that the rest of the planets, Mercury, Venus, Mars, Jupiter, and Saturn, revolved round the sun; the three last also encompassing the earth. Besides these motions, he supposed them all to have a diurnal motion round the earth, as well as the stars.

(255.) The **SEMI-TYCHONIC SYSTEM** supposed the planets to revolve round the sun, while the moon and moon revolve about the earth as their centre of motion; and it supposed the earth to revolve about its axis from west to east in 24 hours. This system differs from the Tychonic only in this, that it supposes a diurnal motion in the earth, but, like the Tychonic, denies an annual one.

(256.) The **CARTESIAN SYSTEM**, so named from its author **DES CARTES**, supposes a variety of vortices or whirlpools, in which the motions of heavenly bodies are performed, being carried round the sun in a vortex of ethereal matter, in different times, proportioned to their distances; each planet having also a particular vortex of its own, in which the motions of its satellites are performed. From the laws of motion it will easily appear, that the irregular motions of the planets cannot be accounted for by these vortices; and besides, the supposition of an ethereal matter, to perform the operations, is without any foundation, or analogy in nature.

CT. II. Of the **COPERNICAN** or **TRUE SYSTEM** of **ASTRONOMY**.

(257.) The Ptolemaic system had gained universal credit, when **COPERNICUS** began to entertain doubts of its truth; and to try if a more satisfactory method, of accounting for the apparent motions of the celestial bodies, might not be obtained, than it afforded. He had recourse to every author upon the subject, but obtained no satisfaction, till he found from **CICERO**, that **NICERAS** a Syracusan had maintained the **MOTION OF THE EARTH**; and from **Plutarch**, that **Pythagoras** and others of the ancients had been of the same opinion.

(258.) From these small hints, this great genius formed a most complete system of astronomy,

capable of solving every phenomenon in a satisfactory manner:—a system, which has been more and more confirmed, by the discoveries and improvements that have been made in astronomy and mathematics, since his time; as well as by the use of telescopes, which have discovered numerous celestial phenomena formerly quite unknown. Like all important discoveries, however, when they run counter to general prejudices, the Copernican system was at first much opposed; and by none more than the celebrated **Tycho Brahe**, who could never assent to the motion of the earth, and who invented the system described in last section, with a view to supersede the necessity of it.

(259.) But while philosophers were divided between the Ptolemaic, the Tychonic, the Cartesian, and Copernican systems, **Sir Isaac Newton** laid down the laws of nature and motion, and, comparing all the phenomena in the heavens, found out the true system of the universe, confirmed the Copernican system of astronomy, and demonstrated by unanswerable arguments, that it could not possibly be otherwise, without the utter subversion of all the laws of nature. This system founded on the laws of nature, and true mechanical principles, is as follows.

(260.) The sun is placed nearly in the centre of the orbits of all the planets, and in these orbits they move round the sun, each in its periodic time. See Plate XV. fig. 7. The sun keeps always in or near the same place; but has a rotation round its axis from west to east in about 25 days. The orbits of all the planets are nearly circular, having the sun for their centre; but in strictness they are ellipses, having the sun in the focus of each of them. These orbits are not all in one plane, and yet do not vary a great deal; they intersect one another in lines that pass through the centre of the sun; the places of the orbits where they intersect are called the *nodes*. All the planets move round the sun the same way, which is from west to east, and are called *primary planets*. Their names and order are, Mercury, Venus, the Earth, Mars, Jupiter, Saturn, and **Herschel**, or the **Georgium Sidus**. Four of these have others revolving about them, which likewise revolve from west to east, and are called *secondary planets* or *satellites*. The Earth has one called the **MOON**, which revolves in 27 $\frac{1}{4}$ days. Jupiter has four, Saturn 7, and the **Georgium Sidus** two. For the characteristic marks of the sun and planets. See Plate XXVIII. fig. 11.

(260.) Besides the planets and their satellites, there is another sort of bodies revolving about the sun, which only appear at particular times. These are the **COMETS**, which move either in very long ellipses, to an immense distance from the sun; or in parabolic curves; and then they never return. These move in all manner of directions round the sun; some the same way as the planets, and some the contrary way; they cut the plane of the earth's orbit in all sorts of angles, some greater and some less. Some of these bodies are several hundred years in making a revolution; and therefore the periodic times of few of them are known. Nor can their number be determined for want of a proper series of observations. There have not been

ASTRONOMY. PART II.

been above 10 of these bodies observed; and of these some may perhaps be the same, coming about again. The whole list of comets upon record, that have been noticed, amount to 450, or at most 500. They are distinguished from other stars, by a luminous stream of light which they emit, (called the tail,) when they come near the sun.

(161.) The fixed stars are at an immense distance, for by the most observations, they have no annual sensible parallax; that is, they appear to the earth when on different sides of its orbit to be exactly in the same places, and the Earth's orbit seen from a fixed star, will appear only as a point. Consequently, the fixed stars are thus without their own native light: for it would be impossible for light, transmitted from the sun to them, ever to be visible, as it would be infinitely weak at that immense distance.

(162.) The distance of the sun is immensely great, in comparison of that of the moon, although it is almost nothing in respect of that of the fixed stars. For the sun's diurnal parallax, that is, the apparent semidiameter of the earth seen from the sun, is so small, that no instruments could be so exactly made as to find it. Hence it is inferred that the sun's magnitude is vastly greater than the earth's. For supposing the sun's parallax to amount to as much as a minute, then since the apparent diameter of the sun is half a degree, this would make the sun's diameter 35 times as big as the earth's; but the sun's parallax is no such thing, for it is found out to exceed $2''$, which will make the sun's diameter 100 times as big as the earth's. That the sun is of a globular form, is plain from the apparent motion of the spots upon its surface; for while the sun moves uniformly about its axis, the spots in the middle of the disk move very quick, but near the edges grow slower and slower, agreeable to the motion of a globe about its axis. By observation of these spots, the sun is found to revolve about its axis in 25 or 26 days.

(163.) None of the celestial bodies, in our planetary system, shine with their own native light, except the sun; so that all the planets, both primary and secondary are opaque bodies, that have no other light but what they receive from the sun, and reflect it back towards the earth and other planets. This is evident from the moon: for only that side of her is observed to shine, which is directly opposed to the sun, but the other side which is from the sun is quite dark, except so far as it is illuminated by the reflection from the earth, for the more of the illuminated side that is turned towards the earth, the more we see her enlightened, the rest being dark; and the more of her dark side that is turned towards the earth, the more of her appears dark. Thus at the full she appears all enlightened, and at her change all dark.

(164.) Mercury and Venus exhibit similar phenomena, and shew all the phases of the moon, according to their various situations; and sometimes appear like a black spot upon the body of the sun. Mars likewise appears gibbous when near the quadrature with the sun. The satellites of Jupiter are

eclipsed when they are behind his body, being then immersed in his shadow; they likewise shew their shadows upon the body of Jupiter. And a Saturn's shadow of the ring upon his body proves his opacity. And the weakness of the light of those that are far distant from the sun, shews that it is not innate but borrowed.

(165.) All the planets are spherical, and the most of them have a rotation round their axis. These motions are found by means of certain spots upon their surfaces, which give us the rate of their rotation. For want of such marks, the rate of the rotation of some planets have not yet been discovered. That they are spherical bodies appears from the slow motion of the spots near the edges, and their swifter motion near the middle. And the line separating the illuminated part from the dark being always elliptical, proves that they are to be spherical.

(166.) Saturn, besides his seven satellites, is encompassed with a thin concentric ring, the diameter is more than double his diameter, and whose breadth is equal to the distance between it and his body. The plane of the ring makes an angle of 31 degrees with the axis, and coincides nearly with the orbits of the satellites. This ring revolves in that plane, in the same manner as a satellite, or rather of a cast wheel, the rings, in some places of his orbit, are not seen, when its plane passes through the earth. In other positions it is visible near the earth.

(167.) The body of Jupiter is also encompassed with several dark lines, called Jupiter's belts, which run about his body parallel to his equator. But these belts are observed not to be permanent, but to increase and decrease, and shew several changes, as do the spots upon his face.

(168.) The surface of the moon is rough, uneven, and full of innumerable mountains, hills, and deep pits. This is plain from the light she always jagged and uneven, the light she running more into the dark than the lower high mountainous parts cast a shadow in a distance, which gradually grows shorter, as the sun's light comes more perpendicular; and the degrees the light shines into the bottom of the valleys, and then the shadows of the spots and mountains disappear. There are several spots on the moon brighter, and some darker, but as they have never been observed in two, and not in their places, magnitude and colour. They are supposed to be no clouds, rain, or water on the moon; for the always has the same appearance. There are no rivers, nor seas, for the spots are smooth, and look most like hills, and small hills and hollows, and the light appears, and therefore can contain no water. The moon turns the same face nearly, towards the earth. The moon is far less than any of the planets, yet appears vastly greater, because it is much nearer to the earth.

(169.) The following table contains a list of the periods, distances, &c. of the planets, according to the latest and best observations.

| | Pe |
|------------|-----|
| MERCURY. | |
| VENUS. | |
| THE EARTH. | |
| MARS. | |
| JUPITER. | 4 |
| SATURN. | 307 |
| HERCULES. | 364 |

| | Gr |
|------------|----|
| | re |
| | le |
| | fr |
| | ea |
| THE SUN. | |
| MERCURY. | |
| VENUS. | |
| THE EARTH. | |
| MARS. | |
| JUPITER. | |
| SATURN. | |

| | Gr |
|------------|----|
| | gr |
| | gr |
| | gr |
| | gr |
| THE SUN. | |
| MERCURY. | |
| VENUS. | |
| THE EARTH. | |
| MARS. | |
| JUPITER. | |
| SATURN. | |

| | Gr |
|------------|----|
| | gr |
| | gr |
| | gr |
| | gr |
| THE SUN. | |
| MERCURY. | |
| VENUS. | |
| THE EARTH. | |
| MARS. | |
| JUPITER. | |
| SATURN. | |

(270.) TABLE I.

| | Periodical re-
volutions
round the
sun. | Proportional
mean dis-
tances from
the sun. | Mean distan-
ces from the
semidiameters of the
earth. | Mean distan-
ces from the
sun in Eng-
lish miles. | Excentricities,
or distances
of the focus
from the
centre. |
|------------|--|--|--|--|--|
| | D. H. M. | | | | |
| MERCURY. | 87 23 15½ | •3871 | 9210 | 37,000,000 | 2960 |
| VENUS. | 224 16 49¼ | •72333 | 17210 | 68,000,000 | 510 |
| THE EARTH. | 365 6 9¼ | 1 | 23799 | 95,000,000 | 1680 |
| MARS. | 686 23 30¼ | 1•52369 | 36262 | 144,000,000 | 14218 |
| JUPITER. | 4332 8 51½ | 5•20098 | 123778 | 490,000,000 | 25277 |
| SATURN. | 10761 14 36¼ | 9•53937 | 227028 | 900,000,000 | 53163 |
| HERSCHEL. | 30445 18 | 19•03421 | 453000 | 1800,000,000 | 4759 |

(271.) TABLE II.

| | Greatest appa-
rent diame-
ter, as seen
from the
earth. | Diameter in
English
miles. | Diurnal rota-
tions upon
their axes. | Inclinations of
their orbits
to the eclip-
tic. | Place of the
ascending
node. |
|------------|---|----------------------------------|--|--|------------------------------------|
| | | | D. H. M. S. | | S. ° ' |
| THE SUN. | 32' 36" | 883217 | 25 15 16 0 | | |
| MERCURY. | 11 | 3222 | unknown. | 7° 0' | 1 15 46½ |
| VENUS. | 58 | 7687 | 0 23 22 0 | 3 23½ | 2 14 44 |
| THE EARTH. | | 7964 | 0 23 56 4 | | |
| MARS. | 25 | 4189 | 0 24 39 22 | 1 51 | 1 17 59 |
| JUPITER. | 46 | 89170 | 0 9 56 0 | 1 19½ | 3 8 50 |
| SATURN. | 20 | 79042 | 0 10 16 0 | 2 30½ | 3 21 48½ |
| HERSCHEL. | 4 | 35109 | unknown. | 0 48 | 3 13 1 |

(272.) TABLE III.

| | Greatest elon-
gation of in-
ferior, and
parallax of
superior
planets. | Proportion of
light and
heat. | Bulk in respect
to the earth. | Proportion of
density. | Place of the
aphelion. |
|------------|---|-------------------------------------|----------------------------------|---------------------------|---------------------------|
| | | | | | S. ° ' |
| THE SUN. | | | 1380000 | ¼ | |
| MERCURY. | 28° 20' | 6•68 | 17 | 2 | 8 14 13 |
| VENUS. | 47 48 | 1•91 | 20 | 1¼ | 10 9 38 |
| THE EARTH. | | 1 | 1 | 1 | 9 9 15½ |
| MARS. | 47 24 | •43 | 70 | 7 | 5 2 6½ |
| JUPITER. | 11 51 | •037 | 1400 | 105 | 6 10 57½ |
| SATURN. | 6 29 | •011 | 1000 | 1 | 9 0 45½ |
| HERSCHEL. | 3 4¼ | •00276 | 90 | 18 | 11 23 23 |

CT. III. Of CENTRIPETAL POWERS in GENERAL.

(273.) As the doctrine of central forces is of the greatest importance in the science of astronomy, it will be proper to explain here, some of the most material propositions relative to that subject.
(274.) In this doctrine, it is supposed, that mat-

ter is equally indifferent to motion or rest; or that a body at rest never moves itself, and that a body in motion never changes either the velocity, or direction of its motion, but would move uniformly forward in a straight line for ever, unless some external force or resistance should stop or change it.
(275.) Hence when a body at rest has a tendency

dency to move, or when a body moving in a straight line, has its velocity continually increased or diminished, or when the direction of a motion is continually changed, and thereby a curve line described; it is supposed that these circumstances proceed from the influence of some power that acts incessantly, which power may be measured in the first case by the pressure of the quiescent body against the obstacle which hinders it from moving; or by the change made on the velocity in the 2d case; or by the flexure of the curve described in the 3d case; due regard being had to the time in which these effects are produced, and other circumstances, according to the principles of mechanics. Now the power or force of GRAVITY produces effects of each of these kinds, which fall under our observation at the surface of the earth, for the same power that renders bodies heavy while at rest, accelerates their motion when they descend perpendicularly, and bends the path of their motion into a curve line when they are projected in a direction oblique to that of their gravity. But we can judge of the forces or powers that act on the celestial bodies by effects of the last kind only, and hence it is that the doctrine of central forces is of so much use in the theory of the planetary motions.

(276.) The following proposition is the foundation of this doctrine and is given by Sir I. Newton in his Principia. The areas which revolving bodies describe by radii drawn to an immoveable centre of force, lie in the same immoveable planes and are proportional to the times in which they are described. Let the time be supposed divided into equal parts, and in the first part let a body be supposed, by its own inert force, to describe a right line, A D, PLATE XVI. Fig. 1. From what we have premised it will appear, that in the 2d part of time the body would describe the line D B equal to A D if nothing acted upon it. But when the body is come to D, suppose a centripetal force tending to the point C acts upon it by a single impulse, such, that it would have carried the body from D to *a* in the same time. The body being now acted upon by two powers, one in the direction D B, and another in the direction D *a* passing through the centre of force, if the parallelogram *a* D B E be completed, the body will move in the diagonal D E, and at the end of the time will be found at E, by the principles of mechanics. Join A C, C E; the triangles A D E, D C B, having equal bases, will therefore be equal, and the triangles C D B, C D E are equal, for they stand on the same base C D, and lie between the parallels D C, B E, therefore the triangles A C D, D C E are equal. By the same method of reasoning, if in the third part of time the body describes any other right line E G, it may be proved that the triangle C D E is equal to C E G, and in a fourth part there will be described a triangle C G I equal to C E G, and so on, it is also obvious that the lines A D, D E, E G, G I, &c. lie in the same plane.

(277.) Thus it appears that in equal times the areas described by radii drawn to the centre of force will be equally increased, and therefore by composition, any sums of the areas are to one another, as the times in which they are described.

Let the number of triangles be supposed to be now augmented, and their breadth diminished to *infinitum*, the lines A D, D E, E G, G I, &c. will now become a curve line lying in the same plane, and the centripetal force which was supposed to act by starts, will now act continually, detaching the body from the tangent, and thus causing it to move in a curve.

(278.) From what has been here shewn, we may infer, that the velocity of a body attracted towards an immoveable centre, in spaces void of resistance is reciprocally as a perpendicular let fall from that centre on the right line that touches the orbit. For draw C Y perpendicular to D E, and suppose the body to describe D E in a given time, hence the velocity of the body will be proportional to D E, and from what has been said, the area of the triangle C E D will be given, for it is proportional to the time, but when the area of a triangle remains the same the base varies inversely as the perpendicular, therefore D E, or the velocity of the body, is inversely as C Y the perpendicular, and the same will hold true, whether the body, by successive impulses, moves in a polygon in the way here described, or by the continual action of the central force, moves in a curve line.

(279.) Sir I. NEWTON also demonstrates the converse of the preceding proposition, which is that if a body move in a curve lying in the same plane, and describe by a radius drawn to a given point, areas proportional to the times; the direction of the power that acts upon the body and bends its way into a curve, is directed to that point. These propositions are general and hold true whatever be the law that regulates the central force and whatever be the direction of the line A B, in which the body is projected; and since these may be indefinitely varied, there is no limit to the varieties of curves that may be described by bodies revolving round a centre of force.

(280.) Having established these general propositions, Sir I. Newton proceeds to inquire what sort of centripetal force is necessary to cause a body to describe various curve lines, but he particularly confines his attention to the conic sections; for he knew that the planets describe ellipses having the sun in one focus. He investigates, by geometrical reasoning, what forces are proper for causing a body to describe various curves, and, in particular, he shews, that if a body describe any conic section by a force tending to one of its foci, the intensity of the force, acting upon the body at different parts of its orbit, will be inversely as the square of the distance of the body from the centre of force.

(281.) He also shews, that if bodies describe ellipses, or circles, by a force tending to the common foci of the ellipses or centres of the circles, and varying inversely as the squares of the distances of the bodies from the centre of force, the squares of the periodic times of the bodies will be proportional to the cubes of their mean distance from that centre. How these propositions are applied to the planetary motions will be seen in the next section.

SECT. IV. *Of the ORBITS and MOTIONS of the PRIMARY PLANETS.*

(182.) Before the time of KEPLER, astronomers supposed that the planets moved in circular orbits with uniform motions, and that the sun was not in the centres of the circles, but at some distance from it. But this justly celebrated astronomer instead of taking for granted the truth of the hypothesis of his predecessors, applied himself with diligence, to make observations on the heavenly bodies, and from his great accuracy in the observations, and sagacity in making deductions from them, he has been considered as at the head of the modern reformed astronomy. He also made use of the observations of Tycho Brahe, and, after much labour, and many mistakes, he at last discovered the great laws of the planetary motions, which are hence called KEPLER'S LAWS. They are these :

(183.) I. The primary planets and comets describe round the sun, and the secondary planets describe round their respective primary planets, as the areas are proportional to the times.

(184.) II. The orbits described round the sun, and round the primary planets, are ellipses, having the sun or the primary planet in the focus.

(185.) III. The squares of the periodic times of the planets revolving round common centres, are proportional to the cubes of their mean distances.

(186.) These laws were deduced by Kepler entirely from observations, and it is obvious, that they are the very same which Sir Isaac Newton has investigated by geometrical reasoning, as the necessary consequences of a body revolving in an ellipse by a force directed towards one of its foci.

(187.) We are therefore warranted to conclude, that the planets are kept in their orbits by a force which is directed to the sun, that the influence of this force extends to the utmost boundaries of the solar system, and we can assign no reason why it may not extend to all distances whatever, observing the same law as the sagacity of Newton has investigated.

(188.) To explain more particularly the orbit of a planet, and the nature of its motion, let A B and E F be the axis of an ellipse, of which D is the centre, and C the focus. See Plate XVI. fig. 1. Suppose that P is the place of a planet moving in the curve A F B E, (supply P in the fig.) and that a tangent line G is drawn touching the curve at P. Join C P, and draw C G perpendicular to P G. The place of the sun will be at C the focus, and the planet will move in the curve ; so that the line C P shall pass over equal areas in equal times.— Since the velocity of the planet is inversely as the perpendicular upon the tangent, and the lines C B, C A are perpendicular to tangents at the points B and A, the velocity at B is to the velocity at A, as C A to C B, and the velocity at B is to the velocity at P as C G to C B. Thus at B, which is called the perihelion, the velocity will be the greatest, and at A the aphelion it will be the least, and at any other point P, it will be between these two extremes. The line C E is equal to B D, which is the mean between B C and C A ; and when the planet is at E, it is said to be at its *mean distance*.— The force, that, acting upon the planet at P,

bends it from the tangent, is to the force that acts upon it at E, any other point, as the square of C E to the square of C P.

(189.) We have hitherto supposed the sun to remain absolutely at rest, and that the planet was urged towards it, as to an immoveable point ; but Sir I. Newton has shewn, that the tendency of the planets towards the sun, arises from a very general law, that not only connects the planets with the sun, but extends from each individual particle of matter to every other particle of matter in the solar system ; a particular case of this law or fact, is the gravity of bodies at the surface of our earth, and the general law that includes all particular cases, has been termed GRAVITATION. Hence it follows, that not only the planets gravitate towards the sun, but the sun gravitates towards the planets ; so that, in strict truth, both the sun and each planet revolve round a point, which is their common centre of gravity, and which is as much nearer to the sun than to the planet, as the sun contains more matter than the planet.

(190.) The truth of this general law is only to be proved by a careful examination of particular cases ; and, supposing it to be true, the effects it ought to produce in the planetary motions round the sun, are in perfect coincidence with the best observations.

(191.) If all matter gravitates to, or is attracted by all other matter, it is evident that the planets must also gravitate towards each other ; and thus in some measure the uniformity of their motions round the sun will be affected. Now this is really found to be the case by the most accurate observations ; and the effects produced are precisely what they ought to be, supposing that the same law, which regulates the tendency of the planets towards the sun, also regulates their tendency to one another.

(192.) If the planets were acted on by a power directed to the centre of the sun only, varying according to the general law of gravity, and that centre was quiescent, their motion about it would be perfectly regular ; but since they are acted on by a power directed to every body of the system, in order to judge of the effects of these actions, Newton first supposes two bodies revolving about their common centre of gravity, and gravitating towards each other, and since the direction of their mutual gravitation passes always through that centre, and their distances from it vary always in the same proportion as their distances from each other, it follows, that they must describe similar figures about that point and about each other, and describe equal areas in equal times, about that centre, and about each other ; so that there will be no irregularities in the motion of two bodies about each other, because of their mutual attractions, whatever the law of their gravity is supposed to be ; only they will revolve in less time about their centre of gravity, than the one would have done about the other quiescent, because the orbit described about the other centre of gravity is less than that which is described by any one of them about the other quiescent ; their distance in both cases being the same, and the orbits similar.

(193.) If three or more bodies mutually attract each

each other, the gravitation of any one of them, arising from the attractions of the rest, may be determined by the rule for composition of motion; and if the law of gravity be such as obtains in the solar system, its gravitation will not be always directed to the centre of gravity of the other bodies, or indeed to any fixed point, but sometimes to one side of that centre and sometimes to the other, and therefore equal areas will not be described in equal times about any point in the system; and some irregularities will therefore arise in the motions of the bodies.

(294.) But if one of these bodies should be vastly greater than the others, so that the actions of the other bodies may be neglected, when compared with its action; and the centre of gravity of the system be always found near it, the irregularities of such a system will be very small, the areas described in equal times about the centre of the great body will be nearly equal, and the orbits described will be nearly elliptic, having that centre in their focus. Now this is the case of the sun and planets, and thus we see that not only the regular motions of the latter are to be derived from the principle of gravity, but also their minute errors and irregularities.

(295.) Though the actions of the sun and of the inferior planets compounded together do not always produce, in a superior planet, a gravitation exactly directed towards their centre of gravity, yet, as, upon the whole, it is more directed to that point, than to any other, the motions of a superior planet will be found more regular, by supposing that point to be the centre of its attraction, rather than any other; and its ellipse will be just, by placing its lower focus there. A planet, that is higher than this, will, by its attraction, have some effect on the motion in this ellipse; but as it also acts on the inferior planets at the same time, there will no irregularity arise from that part of its action which is equal, and in the same direction with them all; but from the differences of its actions only, which being very minute, and having contrary effects in the opposite situations of that higher planet, can produce effects scarcely sensible in many revolutions.

(296.) The action of Jupiter on Saturn, when greatest, (that is when their distance is least,) is found by calculation to be $\frac{1}{100}$ of the action of the sun upon Saturn. This produces an effect not altogether insensible; but the elliptic orb of Saturn will be found to be more just, if we suppose its focus not to be in the centre of the sun, but in the centre of gravity of Jupiter and the sun, or rather in the centre of gravity of the sun and of all the planets below Saturn; and the same observation applies to the orbit of any other planet.

(297.) The whole action of Jupiter disturbs the motion of Saturn in their conjunction, because Jupiter then acts upon Saturn and upon the sun in opposite directions. But because Saturn then acts upon Jupiter and upon the sun in the same direction, if it acted also with the same force on both, it would have no effect on the motion of Jupiter about the sun; and it is by the excess of its action on Jupiter, above its action on the sun, it disturbs the motion of Jupiter. This excess is found to be one 1923 part of the action of

the sun on Jupiter; and therefore is much less than the force with which Jupiter disturbs the motion of Saturn.

(298.) The actions of the other planets on each other are incomparably less than these, and the irregularities proceeding from those actions are always less in any planet, as it is nearer the sun, only the orbit of the earth may appear a little more irregular than its neighbouring planets because it revolves about the centre of gravity of the earth and moon.

(299.) We cannot conclude this section without mentioning a reflection of Sir Isaac Newton upon these small irregularities in the motions of the planets; which contains a very strong philosophical argument against the *eternity of the world*. It is this, that these inequalities must continually increase by slow degrees, till they at length render the present frame of nature unfit for the purposes it now serves. And a more convincing proof cannot be desired against the present constitution having existed from eternity than this, that a certain period of years will bring it to an end. This thought has been represented even as impious, and as no less than casting a reflection upon the wisdom of the Author of nature for framing a perishable work. But so bold an assertion ought to have been made with caution: for if this remark upon the increasing irregularities in the heavenly motions be true in fact, as it really is, the imputation must return upon the asserter, that this does not detract from the divine wisdom. As we know not all the Creator's purposes in making this world, we cannot pretend to determine how long he designed it should last; and it is sufficient if it endure the time intended by the Author. The body of every animal shows the limited wisdom of the Author no less, nay, in many respects more, than the larger frame of nature; and yet we see they are all designed to last but a small space of time. And revelation assures us, that this world is not intended to last for ever.

SECT. V. Of the ORBITS and MOTIONS of the SECONDARY PLANETS.

(300.) The same general principle of gravitation by which the motions of the primary planets are produced, and they made to move round the sun as a centre; extends also to the motions of the secondary planets, both in regard to their motion round the sun along with their primaries, and to their motions round their primaries as a centre, and from observations on the secondary planets we get an additional proof of this general law, that all matter gravitates to all other matter with a force reciprocally proportional to the square of the distance.

(301.) That each secondary planet is kept in its orbit by a power directed toward its primary, is proved from the phenomena of the satellites of Jupiter and Saturn; because they move in circles, as far as we can observe, about their respective primaries with an equable course, the primary being the centre of each orbit: and by comparing the times in which the different satellites of the same primary perform their periods, they are found to observe the same relation to the distance from their primary, as the primary planets observe

serve in respect of their mean distances from the sun. The same thing holds good also with regard to the earth and moon; for she is found to move round the earth in an ellipsis after the same manner as the primary planets do about the sun, excepting only some small irregularities in her motions, the cause of which will be particularly explained in what follows; and it will appear that they are no objections against the earth's acting on the moon in the same manner as the sun acts on the primary planets; that is, as Jupiter and Saturn act upon their satellites.

(302.) The power of Jupiter and Saturn may be measured to a very considerable distance, by the number of satellites which move round them: or the distance of the outermost satellite of each of them exceeds several times that of the innermost. The force of the earth upon the moon, however, at different distances, is more confirmed by the following consideration than any analogical reasoning. It will appear, that if the power of the earth by which it retains the moon in her orbit, be supposed to act at all distances between the earth and moon, according to the rule already mentioned, its power will be sufficient to produce upon bodies near the surface of the earth all the effects ascribed to the principle of gravity. This is discovered by the following method.

(303.) Let A in PLATE XV. fig. 10. represent the earth, B the moon, BCD the moon's orbit; which differs little from a circle of which A is the centre. If the moon in B were left to itself to move with the velocity it has in the point B, it would leave the orbit, and proceed straight forward in the line BE which touches the orbit in B. Suppose the moon would upon this condition move from B to E in the space of one minute of time: by the action of the earth upon the moon, whereby it is retained in its orbit, the moon will really be found at the end of this minute at the point F, from whence a straight line drawn to A shall make the space BFA in the circle equal to the triangular space BEA; so that the moon, in the time wherein it would have moved from B to E, if left to itself, has been impelled towards the earth from E to F. And when the time of the moon's passing from B to F is small, as here it is only one minute, the distance between E and F scarce differs, from the space through which the moon would descend in the same time, if it were to fall directly down from B toward A without any other motion. AB, the distance of the moon from the earth, is about 60 of the semidiameters of the latter; and the moon completes her revolution round the earth in about 27 days 7 hours and 43 minutes: therefore the space EF will here be found by computation to be about $\frac{1}{4}$ feet. Consequently, if the power, by which the moon is retained in its orbit, be, near the surface of the earth, greater than at the distance of the moon, in the duplicate proportion of that distance, the number of feet a body would descend near the surface of the earth, by the action of this power upon it, in one minute, would be equal to the number 16 $\frac{1}{2}$ multiplied twice into the number 1; that is, to 38050.

(304.) How fast bodies fall near the surface of the earth may be known by the pendulum; and by exact

experiments, they are found to descend the space of 16 $\frac{1}{2}$ feet in one second; and the spaces described by falling bodies being in the duplicate proportion of the times of their fall, the number of feet a body would describe in its fall near the surface of the earth in one minute of time, would be equal to 16 $\frac{1}{2}$ twice multiplied by 60; the same as the power which acts upon the moon would cause.

(305.) The earth, in this computation, is supposed to be at rest; but it would have been more exact to suppose it to move, as well as the moon, about their common centre of gravity. The action of the sun upon the moon is also here neglected; and Newton shews, if you take in both these considerations, the present computation will best agree to a somewhat greater distance of the moon and earth, viz. to 60 $\frac{1}{2}$ semidiameters of the latter, which distance is more conformable to astronomical observations; and these computations afford an additional proof that the action of the earth observes the same proportion to the distance which is here contended for.

(306.) Hence it follows, that the power which retains the moon in her orbit is the same as that which causes bodies near the surface of the earth to gravitate; for since the power by which the earth acts on the moon will cause bodies near the surface of it to descend with all the velocity they are found to do, it is certain no other power can act upon them besides; because, if it did, they must of necessity descend swifter; and it is at length very evident, that the power in the earth which we call *gravity* extends up to the moon, and decreases in the duplicate proportion of the increase of the distance from the earth. If to the motion of the satellite whereby it would be carried round its primary at rest, we superadd the same motion, both in regard to the velocity and direction, as the primary itself has, it will describe about the primary the same orbit with as great regularity as if the primary had been indeed at rest. This proceeds from the law of motion, which makes a body near the surface of the earth descend perpendicularly, though the earth be in a swift motion, that if the falling body did not partake of it, its descent would be remarkably oblique.

(307.) From this we learn, that if the satellite moved about its primary with perfect regularity, besides its motion about the primary it would have the same progressive velocity with which the primary is carried about the sun, in a direction parallel to that impulse of its primary. And, on the contrary, the want of either of these, in particular of the impulse towards the sun, will occasion great inequalities in the motion of the secondary planet. The inequalities which would arise from the absence of this impulse towards the sun are so great, that by the regularity which appears in the motion of the secondary planets, it is proved, that the sun communicates to them the same velocity by its action as it gives to their primary at the same distance. Newton informs us, that upon examination he found, that if any of the satellites of Jupiter were attracted by the sun more or less than Jupiter himself at the same distance, the orbit of that satellite, instead of being concentric to Jupiter, would have its centre at

a greater or less distance than the centre of Jupiter from the sun, nearly in the subduplicate proportion of the difference between the sun's action upon the satellite and upon Jupiter. Therefore, if any satellite were attracted by the sun but 100th part more or less than Jupiter is at the same distance, the orbit of that satellite would be distant from the centre of Jupiter no less than a 5th part of the outermost satellite from Jupiter; which is almost the whole distance of the innermost satellite. By the like argument, the satellites of Saturn gravitate towards the sun as much as Saturn itself at the same distance, and the moon as much as the earth.

(308.) The sun therefore acts upon the secondary planets as much as upon the primaries at the same distance: but the action of the sun upon bodies is reciprocally in the duplicate proportion of the distance; therefore the secondary planets being sometimes nearer to the sun than to the primary, and sometimes more remote, they are not always acted upon in the same degree with their primary, but when nearer to the sun are attracted more, and when farther off are attracted less. Hence arise various inequalities in the motions of the secondary planets. Some of these inequalities, however, would take place, though the moon, if undisturbed by the sun, had moved in a circle concentric to the earth, and in the plane of the earth's motion; others depend on the elliptical figure and oblique situation of the moon's orbit. One of the former is, that the moon does not describe equal spaces in equal times, but is continually accelerated as she passes from the quarter to the new or full, and is retarded again by the like degrees in returning from the new and full to the next quarter: but here we consider not so much the absolute as the apparent motions of the moon with respect to us.

(309.) These two may be distinguished in the following manner. Let S, in PLATE XVI. fig. 3. represent the sun, A the earth moving in its orbit BC, DEFG the moon's orbit, and H the place of the moon in her orbit. Suppose the earth to have moved from A to I. Because it has been shown that the moon partakes of all the progressive motion of the earth, and likewise that the sun attracts both the earth and moon equally when they are at the same distance from it, or that the mean action of the sun upon the moon is equal to its action upon the earth; we must therefore consider the earth as carrying about with it the moon's orbit: so that when the earth is removed from A to I, the moon's orbit shall likewise be removed from its former situation into that denoted by KLMN. But now the earth being in I, if the moon were found in O, so that OI should be parallel to HA, though the moon would really have moved from H to O; yet it would not have appeared to a spectator upon the earth to have moved at all, because the earth has moved as much; so that the moon would still appear in the same place with respect to the fixed stars. But if the moon be observed in P, it will then appear to have moved, its apparent motion being measured by the angle OIP. And if the angle PIS be less than the angle HAS, the moon will have approached nearer its conjunction with the sun. Now, to explain particularly the inequality of the

moon's motion already mentioned, let S, in fig. 4. represent the sun, A the earth, BCDE the moon's orbit, C the place of the moon when in the latter quarter. Here it will be nearly at the same distance from the sun as the earth is. In this case, therefore, they will be both equally attracted, the earth in the direction AS, and the moon in that of CS. Whence, as the earth, in moving round the sun, is continually descending towards it, so the moon in this situation must in any equal portion of time descend as much; and therefore the position of the line AC in respect of AS, and the change which the moon's motion produces in the angle CAS, will not be altered by the sun: but as soon as the moon is advanced from the quarter toward the new or conjunction, suppose to G, the action of the sun upon it will have a different effect. Were the sun's action upon the moon here to be applied in the direction GH parallel to AS, if its action on the moon were equal to its action on the earth, no change would be wrought by the sun on the apparent motion of the moon round the earth. But the moon receiving a greater impulse in G than the earth receives in A, were the sun to act in the direction GH, yet it would accelerate the description of the space DAG, and cause the angle GAD to increase faster than it otherwise would. The sun's action will have this effect upon account of the obliquity of its direction to that in which the earth attracts the moon. For the moon by this means is drawn by two forces oblique to one another: one drawing from G towards A, the other from G towards H; therefore the moon must necessarily be impelled towards D.

(310.) Again, because the sun does not act in the direction GH parallel to SA, but in the direction GS oblique to it, the sun's action on the moon will, by reason of this obliquity, contribute to the moon's acceleration. Suppose the earth, in any short space of time, would have moved from A to I, if not attracted by the sun, the point I being in the straight line CE, which touches the earth's orbit in A. Suppose the moon in the same time would have moved in her orbit from G to K, and besides have partook of all the progressive motion of the earth. Then, if KL be drawn parallel to AI, (the line KL must be applied in the figure) and taken equal to it, the moon, if not attracted to the sun, would be found in L. But the earth, by the sun's action, is removed from I. Suppose it were moved down to M in the line IMN parallel to SA, and if the moon were attracted but as much, and in the same direction as the earth is here supposed to be attracted, so as to have descended during the same time in the line LO parallel also to AS, down as far as P, till LP were equal to IM, let PM be joined, the angle PMN will be equal to LIN; that is, the moon will appear advanced as much farther forward as if neither it nor the earth had been subject to the sun's action.

(311.) But this is on the supposition that the actions of the sun upon the earth and moon are equal; whereas the moon being acted upon more than the earth, did the sun's action draw the moon in the line LO parallel to AS, it would draw it down so far as to make LP greater than

M, whereby the angle PMN will be rendered less than LIN. But, as the sun draws the earth in a direction oblique to IN, the earth will be found in its orbit, somewhat short of the point I. However, the moon is attracted by the sun, still more out of the line LO, than the earth is, out of the line IN; therefore, this obliquity of the sun's action will yet farther diminish the angle under PMN. Thus, the moon, at the point G, receives an impulse from the sun, whereby her motion is accelerated; and the sun producing this effect in every place, between the quarter and the conjunction, the moon will move from the quarter, with a motion continually more and more accelerated; and therefore, by acquiring, from time to time, an additional degree of velocity in its orbit, the spaces which are described in equal times by the line drawn from the earth to the moon, will not be every where equal, but those toward the conjunction, will be greater than those toward the quarter. But, in the moon's passage, from the conjunction D, to the next quarter, the sun's action will again retard the moon, till, at the next quarter at E, it be restored to the first velocity which it had in C.

(312.) When the moon moves from E to the full, or opposition to the sun in B, it is again accelerated; the deficiency of the sun's action on the moon from what it has upon the earth, producing here the same effect as before the excess of action. Let us now consider the moon in Q, moving from E towards B. Here, if she were attracted by the sun, in a direction parallel to AS, not being acted on less than the earth, as the latter descends towards the sun, the moon will in the same measure be left behind. Therefore, RF being drawn parallel to SB, a spectator would see the moon move as if attracted from the point Q, in the direction RF, with a degree of force equal to that whereby the sun's action on the moon falls short of its action on the earth. But the obliquity of the sun's action has here also an effect. In the same time the earth would have moved from A to I without the influence of the sun, let the moon have moved in its orbit from Q to R. Drawing, therefore, RT parallel to AI, the moon, by the action of its orbit, if not attracted by the sun, must be found in T; and therefore, if attracted in a direction parallel to SA, would be in the line V parallel to AS; suppose in W. But the moon in Q being farther off the sun than the earth, it will be less attracted; that is, TW will be less than IM; and if the line NM be prolonged towards X, the angle XMW will be less than XIT.

(313.) Thus, by the sun's action, the moon's passage from the quarter to the full would be accelerated, if the sun were to act on the earth and moon in a direction parallel to AS; and the obliquity of the sun's action will still increase this acceleration: for the action of the sun on the moon oblique to the line SA, the whole time of the moon's passage from Q to T, and will carry her out of the line TV towards the earth. Here we suppose the time of the moon's passage from Q to T so short, that it shall not pass beyond the line SA. The earth will also come a little short of the line IN, as was already mentioned; and on these causes the angle XMW will be still

farther lessened. The moon, in passing from the opposition B to the next quarter, will be retarded again by the same degrees as it was accelerated before its appulse to the opposition; and thus the moon, by the sun's action upon it, is twice accelerated, and twice restored to its first velocity every circuit it makes round the earth; and this inequality of the moon's motion about the earth is called by astronomers its variation.

(314.) A second effect of the sun upon the moon is, that it gives the orbit of the latter in the quarters, a greater degree of curvature than it would receive from the earth alone; and, on the contrary, in the conjunction and opposition the orbit is less inflected. When the moon is in the conjunction with the sun at D, the latter attracting her more forcibly than it does the earth, the moon is by that means impelled less to the earth than otherwise it would be, and thus the orbit less incurvated; again, when the moon is in the opposition in B, farther removed from the sun than the earth is, though the earth and moon are both drawn by the sun towards itself out of the place they would otherwise move into, yet the moon descends with less velocity than the earth: insomuch that, in any given space of time from its passing the point of opposition, it will have less approached the earth than otherwise it would have done; that is, its orbit, in respect to the earth, will approach nearer to a straight line.—When the moon is in the quarter in C, and equally distant from the sun as the earth, it was before observed, that they would both descend with equal velocity towards the sun, so as to make no change in the angle CAS; but the length of the line CA must necessarily be shortened.—Therefore, the moon, in moving from C toward the conjunction with the sun, will be impelled more toward the earth by the sun's action, than it would have been by the earth alone, if neither the earth nor the moon had been acted upon by the sun; so that, by this additional impulse, the orbit is rendered more curve, than it otherwise should be. The same effect will also be produced in the other quarter.

(315.) A third effect of the sun's action is, that though the moon, undisturbed by the sun, might move in a circle, having the earth for its centre, by the sun's action, if the earth were to be in the very middle or centre of the moon's orbit, the moon would be nearer the earth at the new and full, than in the quarters. This may at first appear somewhat difficult to be understood, that the moon should come nearest to the earth where it is least attracted by it: yet, upon a little consideration, it will evidently appear to flow from that very cause, because her orbit, in the conjunction and opposition, is rendered less curve; for the less curve the orbit is, the less will the moon have descended from the place it would move into without the action of the earth.

(316.) If the moon were to move from any place without further disturbance from that action, since it would proceed on the line touching the orbit in that place, it would continually recede from the earth; and therefore, if the power of the earth upon the moon be sufficient to retain it at the same distance, this diminution of that

diminution of the force is equal to the addition, which makes no alteration.

The mean force PT is $= \frac{1}{643410}$ of the force of gravity at the earth.

For the force of gravity is 3600 times greater than the force at P.

The whole increase of the centripetal force at P is

$$\frac{c}{178.725} \times \left(1 - \frac{3ss}{rr}\right)$$

$$\text{For rad } (r) : s :: \text{PT} \left(\frac{c}{178.725}\right) : \text{PK} =$$

$$\frac{cs}{178.725r} \cdot \text{And PR} = 3\text{PK} = \frac{3cs}{178.725r} \cdot \text{And rad}$$

$$) : \text{PR} \left(\frac{3cs}{178.725r}\right) :: \text{S.R } (s) : \text{PQ} =$$

$$\frac{3cs}{178.725rr} \cdot \text{And PT} - \text{PQ} = \text{whole additional}$$

$$\text{force} = \frac{1 - \frac{3ss}{rr}}{178.725} c.$$

If A = sine of twice the moon's distance from the quadratures; then the force QR, accelerating or re-

arding the moon's motion in its orbit, is $\frac{3c}{178.725}$

$$\frac{A}{2r}.$$

Let $z = \text{S.QPR}$ or $\text{KPT} = \text{cof. PTK}$; then

$$1(r) : \text{RP} \left(\frac{3cs}{178.725r}\right) :: \text{S.QPR } (z) : \text{QR} =$$

$$\frac{3c}{178.725rr} \times rz = (\text{by trigonometry}) \frac{3c}{178.725} \times$$

322) Hence the moon is accelerated in the quadrants CA, DB; and retarded in the quadrants AD, CB; and the force which accelerates or retards the moon's motion, is greatest in the octants.

For it is greatest when A is greatest, that is when CP is 90 degrees, or CP = 45°.

The disturbing force TM, in the syziges A and B, is PT. And therefore the earth's force upon the moon in the syziges, is twice as much diminished, as it is increased in the quadratures.

The moon's orbit is more flat in the syziges, and more curve in the quadratures; and therefore she is farther from the earth in the quadratures.

For the orbit will be more curve where the centripetal force is greater, that is in the quadratures.

323.) The motion of the moon's nodes, supposing the orbit to be nearly circular, may be thus found.

Fig. 6. Let AqBQ be the moon's orbit, T the earth, P the moon, SAB the line of the apsidal, and Nn the line of the nodes. PH, AZ perpendiculars upon TQ and Nn.

The force by which the moon is drawn out of her

orbit, has been found to be $\frac{3s}{178.725r} c =$

$\frac{s}{59.575r} c$. Let PM be the arch which the moon

describes in any small time; and ML a small line, which the moon describes in the same time by the

force $\frac{s}{59.575r} c$, as this force is directed to the

sun, the line ML will be parallel to TA. As ML is the distance that the moon is drawn from the arch PM, by the said accelerative force; 2ML will be the uniform motion it has acquired in that time, by the said force. Let MP be continued back to m, in the moon's orbit, to cut the line of the nodes TN in m. Now since ML is parallel to the ecliptic; a plane drawn through ML and MPm, will cut the ecliptic in a line ml, which will be parallel to ML; therefore draw LP/ to cut ml in l, and the triangles PML and Pml are si-

milar, and therefore $ml = \frac{mP \times ML}{MP}$; but since

MP is given, and ML is as the force 3PK, therefore ml is as mP × PK. Now when the moon was at P, the line of the nodes was at Tm, where the plane of the moon's orbit TMP cuts the ecliptic. But when the moon comes to L (instead of M,) the plane of her orbit will then be in the plane TLP; and the line of the nodes at T/, where the plane TLP/ cuts the ecliptic. Therefore the angular motion of the nodes generated in that time will be = angle mT/. But the angle mT/ is

as $\frac{ml}{Tm} \times \text{fine of } Tml \text{ or } ATN$; that is, as

$\frac{mP \times PK}{mT} \times AZ$; that is, (because by similar

triangles $\frac{mP}{mT} = \frac{PH}{PT}$) as $\frac{PH \times PK}{PT} \times AZ$,

that is, (because PT is given) as PH × PK × AZ.

The line ML is to the versed sine of the arch PM, as the forces that produce them; that is, as

$\frac{s}{59.575r} c$ to c, or as s to 59.575r. That is ML :

$$\frac{PM^2}{2MT} :: s : 59.575r; \text{ therefore } ML = \frac{PM^2}{2MT} \times$$

$\frac{s}{59.575r}$. When P falls upon A, or the moon is

in the syzigy; then s = r, and the angle PML is a right angle; therefore in the triangle PML, PM :

$$ML \left(\frac{PM^2}{2MT \times 59.575r} \right) :: \text{radius} : \text{S.LPM or}$$

$$mPl = \frac{PM}{2MT \times 59.575r} \cdot \text{And if N be at Q, or}$$

the nodes in the quadratures, and P at A; then PM and PL being parallel to the ecliptic, m and l will

It will be at an infinite distance, and then the angle mT will be equal to mP , whose sine is

PM And the angle mT answering to PM , is the motion of the node, whose sine is

PM Suppose PM to be described in

an hour, then PM or the mean horary motion is

34' 56" 30, whose sine, as it differs insensibly from

the arch, we shall have the arch = $\frac{34' 56" 30}{59.575}$ (put-

ting $PM = 1$) = $34' 56" 30$, where all the angles

PTK, PTN and STN are right angles. And in

other cases, the horary motion of the node will

be to $34' 56" 30$, as the product of the sines of the

three angles PTK, PTN and STN, to the radi-

us cube; and the nodes are regressive when all

the sines are positive. But if any sine changes to

be negative, the nodes will be progressive.

(324.) Hence the nodes are progressive, when the

moon is between either quadrature, and the node

is north of that quadrature; otherwise they are regres-

sive. And by the excess of the regress above the pro-

gress, they are in the whole moved forward.

For in the arches QJW and QJN , PK and PH

are both affirmative or both negative. And in the

arches NQ, &c., only one is negative, the other

being affirmative.

(325.) If it were not for the sun's perturbing

force, the moon would always describe the same

ellipse, and the transverse axis and eccentricity

of the orbit would remain unaltered. But since

the perturbing force of the sun always acts upon

her more or less, and causes all the irregularities

of her motion, it is evident that all these effects

will be the greater as that force is the greater.

But when the transverse axis or line of the apses

is in the syzygies, then the perturbing force T M

or P K fig. 5. is the greatest possible, by which

the moon is removed farther from the earth, and

the eccentricity becomes greater. And the contrary

happens when the transverse is in the quadratures,

for by its being in the quadratures, the

force T M is greater; and the whole centripetal

force towards T being greater, the body will be

drawn nearer the earth and describe a less orbit,

or one less eccentric than before. Therefore when

the apses are in the quadratures, the eccentricity

is less; and when they are in the syzygies, it is

greater. But how much it is greater or less de-

pends upon the mean eccentricity, and that de-

pends upon observation.

(326.) Hence the eccentricity constantly increases,

as the apses move from the quadratures to the

syzygies, and decreases from the syzygies to the

quadratures. And the eccentricity of the orbit constantly

increases, as the moon passes from the quadratures

to the syzygies, and decreases, in passing from the

syzygies to the quadratures. For the perturbing

force increases from the quadratures to the sy-

zygies, and decreases from the syzygies to the

quadratures.

SECT. VI. Of the Nature and Motion of COMETS.

(327.) It is certain that COMETS are not more in our air, because they rise and set in the same manner as the moon and stars. The astronomers have gone so far in their enquiries concerning them, to prove by their observations, that they move in the celestial spaces beyond the moon; but they had no notion of the path which they describe. Now the power of the sun being reciprocal the duplicate proportion of the distance, the body acted upon by him must either fall down, or move about him in one of the conic sections, viz. either the ellipse, parabola, or hyperbola. If a body which descends towards him as low as the orbit of any planet, moves in a faster motion than the planet, it will describe an orbit of a more oblong figure than his; and the velocity of the body may be so great, that it will move in a parabola, so that having once passed the sun it will proceed for ever without returning. If a body which descends towards the sun will still continue in the focus of the parabola; and with a velocity still greater, it will move in an ellipse, or hyperbola. It is, however, not probable, that the comets move in very eccentric ellipses; and hence those bodies are sometimes at a moderate distance from the sun, and sometimes at vast distances, far beyond the orbit of Saturn, and become invisible.

(328.) That the comets do move in this manner is proved from computations built upon the observations made by many astronomers. The computations were made by Sir Isaac Newton on the comet which appeared toward the year 1680 and beginning of 1681, and were produced by Dr Halley upon this and several other comets. They depend on this principle, that if they are really elliptical, yet that the ellipse which comes under our view approaches near to a parabola that they may be taken such without any sensible error.

(329.) Sir Isaac teaches a method of finding the parabola in which any comet moves, by observations made upon it in that part of its orbit where it agrees nearest with a parabola. The theory is confirmed by astronomical observations for the places of the comets may thus be computed as exactly as those of the primary planets, and shows how to make use of any method to determine whether the orbits of the comets are elliptical or not; and thus to know when the same comet returns at different seasons. On this Dr Halley observed, that the comet of 1681, in its orbit to agree more exactly with an ellipse, than a parabola, though the ellipse be so very eccentric that it cannot perform its revolution in less than 500 years.

On this Dr Halley observed, that the comet of 1681, which appeared three several times before, first was before the death of Julius Cæsar, each appearance happened at the interval of years, the last coinciding with the year 1066.

SECT. VII.

Where calculated the motion of an eccentric orbit, it is less than 50 years.

To compare the motion of this comet with any other of the same kind, it is necessary to know the distance of its orbit from the sun, for it is impossible to compare the motions of two comets, unless we know the distance of each from the sun.

It is probable that they are parabolic orbits, and therefore the distance of each from the sun, is not less than 1000 times the distance of the earth from the sun.

Dr Halley's computation of the year 1680 or 1681, is very liable to be of use, as it is the greatest as the comet is the most distant from the sun, and therefore the greatest error in the computation will be in the distance of the comet from the sun.

See Part I. Sect. VII. Of the Motion of the Comets.

The primary planets and the comets are distinguished by the distance of their orbits from the sun, and by the time they take to perform their revolutions.

The primary planets are distinguished by the distance of their orbits from the sun, and by the time they take to perform their revolutions.

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The comets are distinguished by the distance of their orbits from the sun, and by the time they take to perform their revolutions.

erefore calculated the motion of this comet to in such an excentric orbit, that it could not turn in less than 575 years; which computations agree yet more perfectly with the observations made on this comet than any parabolic orbit will do. (330.) To compare together different appearances of the same comet, is indeed the only method of discovering with certainty the form of its orbit; for it is impossible to discover the form of so exceedingly excentric from observations taken in a small part of it. Sir Isaac Newton therefore proposes to compare the orbits, on the supposition that they are parabolical, of such comets appear at different times; for if we find the same orbit described by a comet at different times, all probability it will be the same comet that describes it. Here he remarks from Dr Halley, that the same orbit very nearly agrees to two appearances of a comet about the space of 75 years distance; so that if these two appearances were really of the same comet, the transverse axis of its orbit would be 18 times that of the axis of the earth's orbit; and therefore, when at its greatest distance from the sun, this comet would be removed not less than 35 times the mean distance of the earth from the same luminary. Even this is the least distance assigned to any comet in its greatest elongation from the sun; and on the foundation of Dr Halley's computations it was expected the year 1758 or 1759.

(331.) Sir ISAAC NEWTON remarks, that as the great excentricity of the orbits of comets renders them very liable to be disturbed by the attraction of the planets and other comets, it is probably to prevent too great disturbances from these, that while all the planets revolve nearly in the same plane, the comets are disposed in very different planes and disposed all over the heavens; that when at their greatest distance from the sun, and moving slowest, they might be removed as far as possible out of the reach of each other's action. The same is likewise answered in those comets, which move slowest in the aphelion or remotest distance from the sun, descended nearest to it by passing their aphelion at the greatest height from the sun. See PART I. SECT. III. 130—134. and SECT. IV.

SECT. VII. *Of the BODIES of the SUN and PLANETS, the QUANTITY of MATTER they contain, and their DENSITIES.*

(332.) The primary planets and comets being retained in their orbits by a power directed towards the sun, and the secondaries being also retained by a similar power directed to the centre of the primary, the same power is diffused through their whole substance, and inherent in every particle. This is proved by showing that each of the heavenly bodies attracts the rest, and other bodies, with different degrees of force, as that the force of the same attracting body is exerted on others, exactly in proportion to the quantity of matter contained in the body attracted.

(333.) The first proof of this is from the experiments made on bodies on our earth. Pendulums vibrate by the same power which makes heavy bodies fall to the ground; but if the ball of any

pendulum of the same length with another were more or less attracted in proportion to the quantity of solid matter it contains, that pendulum must then vibrate faster or slower than the other. Now the vibration of pendulums continue for a long time, and the number of vibrations they make may be easily determined without any suspicion of error; and Newton assures us, that he examined several substances, as gold, silver, lead, glass, sand, common salt, wood, water, and wheat; in all which he found not the least deviation from the theory, though he made the experiment in such a manner, that in bodies of the same weight, a difference in the quantity of their matter less than the thousandth part of the whole would have discovered itself.

(334.) It appears, therefore, that all bodies are made to descend here by the power of gravity with the same degree of swiftness. This descent has been determined at $16\frac{1}{2}$ feet in a second from the beginning of their fall. If any terrestrial body could be conveyed as high up as the moon, it would descend with the very same degree of velocity with which the moon is attracted towards the earth; and therefore the power of the earth upon the moon bears the same proportion it would have upon those bodies at the same distance as the quantity of matter in the moon bears to the quantity in those bodies. Thus the assertion is proved in the earth, and its power on every body it attracts is, at the same distance from the earth, proportional to the quantity of solid matter in the body acted upon.

(335.) As to the sun, the power of his action upon the same primary planet is reciprocally in the duplicate proportion of its distance; and that his power decreases throughout in the same proportion, is testified by the motion of the planets traversing the whole planetary region. This proves that if any planet was removed from the sun to any distance whatever, the degree of its acceleration towards the sun would yet be reciprocally in the duplicate proportion of their distance. But the degree of acceleration given to the planets by the sun is reciprocally in the duplicate proportion of their respective distances; all which, compared together, puts it out of doubt, that the power of the sun upon any planet removed into the place of any other, would give it the same velocity of descent as it gives that other; and consequently that the sun's action upon different planets at the same distance would be proportionable to the quantity of matter in each. The sun attracts the primary planets and their respective secondaries, when at the same distance, in such a manner as to communicate to both the same degree of velocity; and therefore the force wherewith the sun acts on the secondary planet bears the same proportion to the force wherewith it attracts the primary, as the quantity of matter in the secondary planet bears to the quantity of matter in the primary.

(336.) This property therefore is found in the sun with regard to both kinds of planets; so that he possesses the same quality found in the earth, viz. that of acting on bodies with a degree of force proportional to the quantity of matter they contain.

This point being granted, it is hardly to be supposed that the power of attraction with which the other planets are endowed, should be different from that of the earth, if we consider the similitude of these bodies; and hence it follows, that this attraction extends itself to every particle of matter in the attracted body, and that no portion of matter is excepted from the influence of these bodies to which this attractive power has been proved to belong.

(537) In a word, the attractive power both of the sun and planets appears to be the same in all: for it acts in each in the same proportion to the distance, and in the same manner acts alike upon every particle of matter. This power, therefore, in the sun and planets, is not of a different nature from the power of gravity in the earth, and this enables us to prove, that the attracting power lodged in the sun and planets belongs likewise to every part of them; and that their respective powers upon the same body are proportional to the quantity of matter in which they are compounded; for instance, that the force with which the earth attracts the moon, is to the force with which the sun would attract it at the same distance, as the quantity of solid matter in the earth is to that in the sun:

(38.) The rule that action is equal to reaction, holds good in the attractive powers as well as in any other. The most remarkable force of this kind with which we are acquainted, next to that of gravity, is the attraction of iron. When two pieces of iron are placed in contact, or so near to each other as to swim on water, both of them would move towards each other, and thus the attraction would be shown to be mutual; and when they meet, they will mutually stop each other. which shows that their velocities are reciprocally proper to the quantities of matter attracted. If one piece of iron, by the force of the stone's attracting the iron, receives as much motion itself, in the direct phlogistic sense of the word, as it communicates to the stone, for it is proved from experiments on the percussion of bodies, that if two meet with equal velocities reciprocally, they will stop each other, but if they will be stopped by the encounter, or help to stop each other, they will stop each other, or help to stop each other with some other velocity, or the elasticity will turn into fresh motion.

(1397) From the mutual action of the fun and planets upon each other, it follows, as has been already mentioned, that they both revolve about their common centre of gravity. Thus let A (see Plate XVI. fig. 7.) represent the fun, B a planet, and C-VI. their common centre of gravity: if these bodies were once at rest, they would gravitate towards each other, and by their mutual attraction, and such vicinities, that their common centre of gravity would remain at rest, and they would meet in that point. Were the planet B (to receive an impulse, as in the direction BE, this would prevent the two bodies from falling together, but their common centre of gravity would be put into motion in the direction of the line CF, parallel to BE. In this manner the fun and planets would revolve round their common centre of gravity similar orbits, while that centre would proceed with an uniform velocity in the line CF, and so the system of the two bodies would move on with

the centre of gravity without end. In order to keep the system in the same place, it is necessary, then, when the planet received its impulse in the direction BE, the sun should receive (each another) in the contrary way, so as to keep the centre of gravity C without any motion, in which case it would always remain fixed.

ways readily admit, therefore, between the two planets is mutual. The power which attracts the sun and primary planets is a part of the same nature with that which attracts the secondary planets and their primaries, or the sun between the earth and bodies near it. In different planets the force of the sun is as upon each at the same distance, would be proportional to the quantity of solid matter contained in the planet: therefore the reaction of the planet on the sun at the same distance, would also be proportional to the quantity of solid matter contained in each planet. The force which attracts the sun would also be proportional to the quantity of solid matter in the planet; that is, the planet at the same distance, would act on the sun with the degrees of strength proportional to the quantity of solid matter contained in each.

(345.) From their principles, Newton has deduced that each of the particles out of which the sun, moon, and planets are formed, can exert a power of gravitation by the force *act*, as well as the same proportion to the distance, as the *graves* of the atmosphere. In this principle, he has demonstrated that if a globe composed of such particles would by itself attract the particles of its body reciprocally in the duplicate ratio of their distances, the whole globe would attract the firm in the reciprocal duplicate ratio of the square of its distance. He has also provided it that of equal density throughout, if a globe acts upon distant bodies by the force now specified, and the power of the globe is derived from its being composed of attractive particles, each of these will attract after the same manner as the whole globe. Therefore, if the particles of a body within a globe attract the reciprocal duplicate proportion of their distances from the centre; and therefore, if the same distance from the globe, on whatever side the body be placed the globe will

ly put it. § 124. Now, if the particles, of which the globe is composed, acted upon those which are placed at the surface, in the same manner as the whole globe would act upon them, in the same manner as it does: if the particles of the globe, have not all of them that property, which the whole globe has, of acting stronger than is that proportion, which each weaker 1, and if this be the mode in which the particles of the globe, act, it is plain, that when the particles of the globe, are placed at the surface, the greater number of the stronger particles, attracted to it, the body will be more drawn than when, by turning the globe, the greater quantity of weak particles, remain near the surface, and the stronger particles, though the distance of the particles, from the centre, be the same, remain the same from the centre of the globe, and that the globe acts equally on all particles of the one globe attract all the particles of the other globe already near the surface.

SECT. VII. I.

SECT. VII. I.
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in proportion to the di-
ameter of the globe which at-
tracts it, which is attracted
by the, though either or both
composed of dissimilar parts,
and dense; provided on
the same globe, equal
be homogeneous, and like
each other.

And each other.
But if these have thus
in the great bodies of the
same being lodged in a
which compels them
to move less than waves in
water be too minute to
show on the firm bodies
where, by their action
and thus indeed we have
they have this power, a
to demonstrate that they
are by it. But since the
of all bodies where

...and we find that
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| | Quant. of Matter |
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| Sea | 138.343 |
| Land | 8 |
| Imper | 31.8 |
| Swam | 86.36 |
| Herivel | 18 |

Attracting globe will act upon the other in the same proportion to the distance between the centre of the globe which attracts, and the centre of that which is attracted : and the proportion holds true, though either or both of the globes be composed of dissimilar parts, some rarer, and some more dense ; provided only, that all the parts in the same globe, equally distant from the centre, be homogeneous, and likewise if both globes attract each other.

(343.) Sir Isaac has thus shown, that this power of the great bodies of the universe is derived from the same being lodged in every particle of the matter which composes them ; and consequently that it is no less than universal in matter, though the power be too minute to produce any visible effects on the small bodies with which we are conversant, by their action on one another. In the fixed stars indeed we have no particular proof that they have this power, as we find no appearance to demonstrate that they either act or are acted upon by it. But since this power is found to belong to all bodies whereon we can make observation, and we find that it is not to be altered by any change in the shape of bodies, but accompanies them in every form, without diminution, remaining ever proportional to the quantity of solid matter in each ; such a power must, without doubt, universally belong to matter.

(344.) From the times in which these satellites perform their revolutions, compared with their distances from their respective primaries, the proportion between the power with which one primary attracts his satellites, and the force with which any other attracts his, will be known ; and the proportion of the power with which any planet attracts his secondary to the power with which it attracts a body at its surface, is found by comparing the distance of the secondary planet from the centre of the primary to the distance of the primary planet's surface from the same ; and from hence is deduced the proportion between the power of gravity upon the surface of one planet and the gravity upon the surface of another.

(345.) By the like method of comparing the periodical time of a primary planet about the sun, with the revolution of a satellite about its primary, may be found the proportion of gravity, or of the weight of any body, on the surface of the sun, to the gravity or to the weight of the same body on the surface of the planet which carries about it a satellite. By computations of this kind, astronomers have found the relative densities of the sun and such planets as have satellites, together with their quantities of matter and the space through which a heavy body would fall in 1 second at their surfaces. The result of these calculations may be arranged as in the following table :

| | Quant. of Matter. | Density. | Fall of a body in 1 second. In Feet. |
|----------|-------------------|----------|--------------------------------------|
| Sun | 338343 | 100 | 450 ^o 9 |
| Earth | 1 | 395 | 16 ^o 09 |
| Jupiter | 317.1 | 98 | 41 ^o 64 |
| Saturn | 86.16 | 69 | 14 ^o 4 |
| Herschel | 18 | 22 | 18 ^o 66 |

... and we may draw the following conclusions, viz. That the sun is rarefied by its great heat ; and that of the 4 planets above-mentioned, the most dense is that nearest the sun.— The densities of the planets Mars, Venus, and Mercury, as they are not attended with satellites on which observations may be made, cannot be ascertained. From analogy, however, we ought to conclude, that the inferior planets, Venus and Mercury, are more dense than the earth, and Mars more rare.

PART III.

EXPLANATION OF THE CELESTIAL PHÆNOMENA, ACCORDING TO THE NEWTONIAN DOCTRINE.

SECT. I. Of the CIRCLES, NODES, ASPECTS, CONJUNCTIONS, &c. of the PLANETS.

(347.) To a spectator placed in the sun, all the planets would appear to describe circles annually in the heavens : for though their motions are really elliptical, the excentricity is so small, that the difference between them and true circles is not easily perceived even on earth ; and at the sun, whether great or small, it would entirely vanish. These circles, which in such a situation would appear to be annually described among the fixed stars, are called the *heliocentric circles* of the planets. To a spectator in the sun, the comets, though moving in the most excentric orbits, would also appear to describe circles in the heavens : for though their orbits are in reality very long ellipses, the planes of them extended to the heavens would mark a great circle of which the eye would be the centre ; only, as the real motion is in an ellipsis, the body would appear to move much more slowly in some part of the circle than another, and to differ excessively in magnitude.

(348.) To an inhabitant of any planet, however, the sun appears to go round in its own heliocentric circle, or to describe in the heavens that same curve, which the planet would appear to do if seen from the sun. Thus in Plate XVI. fig. 8. when the earth is at *a*, if we draw a line from *a* through the sun at *S*, the point *G*, in the sphere of the heavens where the line terminates, is the place where the sun then appears to an inhabitant of the earth. In a month's time the earth will go from *a* to *b* ; draw a line then through the sun, and its extremity at *H* will point out his apparent place at that time. In like manner, if we draw lines from the earth in 12 several situations in which it is represented for the 12 months of the year, the sun's apparent place will be found as above ; and so it would be found by a spectator placed in Venus or any other planet.

(349.) The heliocentric circle of the earth is called the *ECLIPTRIC* ; because eclipses of the sun or moon can only happen when the latter is in or near it. By some ancient writers, it has been called the circle of the sun, or the oblique circle, because it cuts the equator at oblique angles. It is also called by Ptolemy the circle which passes through the midst of the animals ; because the 12 constellations, through which it passes, were anciently all represented by animals, or parts of them,

them, though now the balance is introduced in place of the claws of the scorpion. For this reason, a belt taken in the concave sphere of the heavens about to degrees on each side of the ecliptic, is called the zodiac; from *zoo*, an animal, and the constellations through which the ecliptic is drawn, are called the constellations of the zodiac.

(3530) Although the sun apparently goes round the earth many times in this circle, we cannot determine his place by mere inspection, as we can do that of any other heavenly bodies; for the fixed stars are the only marks by which we can determine the place of any of the celestial bodies; and the superior brightness of the sun renders them totally invisible, except in the time of a great eclipse, when his light is for a time totally obscured. But though we cannot know the place of the sun directly, it is easily found from a knowledge of that of fixed stars which are opposite to him.

(1316). Thus, in PLATE XVI, fig. 3, suppose it the middle of the year in which the earth is at g , if we know that the point G is then diametrically opposite to the sun, we know that A , its opposite, is the sun's place, and consequently, by finding the places throughout the year diametrically opposite to the sun, as $GHIKLMABCDEF$, we may be assured that in these times the sun's place was in the points $A B C D E F G H I K L M$. The point in the heavens diametrically opposite to the sun may be known every night at God's house, by the stars which are visible; for the star which has an elevation above the horizon, at that time equal to the sun's depression below it, is directly opposite to him).

(352.) When the ECLIPSE is thus found, the latitude of the moon or any star is counted by its distance from the ecliptic, in the same manner as the latitudes of places on the earth are reckoned by their distance from the equator, and circles passing thro' the poles of the ecliptic at right angles to its plane, are called *circles of latitude*. The DECLINATION of any celestial body is its deviation from the equator towards the pole nearest to it.

rod in the air. THE LATITUDE of any planet is either *heliocentric* or *geocentric*. The *heliocentric latitude* is its distance from the ecliptic as seen from the sun, and its *geocentric* as seen from the earth. As the orbits of the planets are inclined in different angles to the ecliptic, the heliocentric latitude of any planet is always different from its geocentric latitude. Thus, let A, B, *PLATE XVII.* fig. 3, be the orbit of the earth, C D the orbit of Venus, viewed with the eye in their common focus, wherein they appear straight lines; let E and F be two opposite points of the ecliptic; and suppose Venus to be in the point C. If we were at that time viewed from the sun, Venus would appear at the point of the heavens marked H, and her *heliocentric latitude* is then F H. But if viewed from the earth in B, she will appear at g, and her *geocentric* is only F g.

The two points where the heliocentric circle of any planet cuts the ecliptic, are called its **KODAS**; and each the planet passes through as it goes **q**uis.

Thus, in Street's Caroline Tables, the longitude of Jupiter's ascending node is two signs eight degrees from the first star of Aries, which is thus marked: Long. Υ \oslash δ 1° γ 2° $8'$. The common way of reckoning the longitude of a phenomenon is to take γ for the first point of the ecliptic, and not to number the degrees quite round that circle as a continued series; but to make a new beginning at the first point of every sign, and to reckon from thence only the length of 30° . When this method is made use of, the longitude of any phenomenon is expressed by saying it is in such a degree and such a minute of a sign: and thus we may express the longitude of the ascending node of Mercury, \oslash \oslash δ 13° $40'$; and so of any other. The place of a phenomenon in the heavens is expressed by setting down its longitude and latitude.

(359.) Every planet like the moon, is sometimes in CONJUNCTION with the sun, and sometimes in OPPOSITION. Its conjunction is when the geocentric place of the planet is the same with that of the sun; though an exact or central conjunction can only take place when the line of its nodes passes through the earth, and the planet itself is in one of its nodes at the time. It is however, in general, called a conjunction or opposition, when the same circle of latitude passes through the sun and planet at the same time. When the geocentric place of a planet is 90° , or a quarter of a circle from the sun's place, the planet is said to be in QUADRATURE or in a *quartile* aspect with the sun; and these terms are used in a like sense when applied to any two of the heavenly bodies. Thus the sun and moon, or the moon and any planet, or any two planets, may be in conjunction, opposition, or quadrature.

(360.) Besides these, the ancients reckoned two other aspects, the TRINE and the SEXTILE; the former when the bodies were distant 120° , and the latter when only half that distance. These aspects are marked thus:

Conjunct. Opposition. Quadrature. Trine. Sextile.

\oslash \oslash \square \triangle $*$
These aspects were formerly supposed to influence the affairs of mankind; but ASTROLOGY, which pretended of these influences, is now justly rejected.

(361.) The inferior planets have two kinds of conjunction with the sun; one in the inferior part of their semicircles, the other in the superior part. In the former, the planet is between the earth and the sun; and in the latter, the sun is between the earth and planet. The inferior planets can never be in opposition to the sun, nor even appear at great distance from him. The length they go from the sun is called their *elongation*. Thus, in PLATE XVI.

Fig. 11. let OPQRT be part of the ecliptic; S the sun; and the three circles round him, the orbits of Mercury, Venus, and the Earth. Suppose the earth to be at A, the sun's geocentric place to be at Q. If Mercury be then at I, his geocentric place is likewise at Q; so that he is in conjunction with the sun in his inferior semicircle: if at M, his geocentric place is likewise at Q: so that he is in conjunction in his superior semicircle.

(362.) In like manner, Venus at E is in conjunction in her inferior semicircle, at G in her superior: but if we suppose the earth to be at A,

and Venus at H, her geocentric place is T, and her elongation QT, which in this figure is the greatest possible; for this always takes place when a straight line from the earth touches the orbit of the planet, as is evident from the figure; that is, provided the planet be in its aphelion at the time. Thus the greatest possible elongation of Mercury is QP when he is in his aphelion at L; and the quantity of this is found by astronomical observations to be about 28 degrees, and that of Venus about 48. The inferior planets in their elongations are sometimes eastward and sometimes westward of the sun; in the former case they appear in the evening, and in the latter in the morning. The smallness of Mercury and his nearness to the sun prevent him from being often taken notice of; but the largeness and beauty of Venus have made her, in all ages, celebrated as the *evening* and *morning star*.

(363.) The planets sometimes appear to go forward, sometimes backward, and sometimes to stand still. These different conditions are by astronomers called *direct*, *retrograde*, and *stationary*. Were they to be viewed from the sun, they would always appear direct; but when viewed from the earth, the inferior planets appear direct while moving in their upper semicircles, and retrograde when in their lower ones. Thus in fig. 11. suppose the earth at rest at A, while Mercury is going on in his orbit from N to I, and from I to L, his motion appears to an observer at A to be retrograde, or contrary to the order of the signs, namely, from R to Q and from Q to P; but when in that part of his orbit which lies between L and N, his motion appears direct, or from P to Q and from Q to R.

(364.) When the earth is in the line of nodes of an inferior planet, the apparent motion of the former is then in a straight line, because the plane of it passes through the eye: if in a conjunction in his upper semicircle, he passes behind the sun: if in his lower semicircle, he passes before it, and will then be seen by an observer on earth to pass over the sun's disk like a round and very black spot. Were the plane of his orbit coincident with the ecliptic, this appearance would be seen every year; but by reason of the obliquity of the two planes to each other, it is much more rare.

(365.) MERCURY, however, was seen in this manner November 12th, 1782, at 3 h. 44' in the afternoon; May 4th, 1786, at 6 h. 57' in the morning; and December 8th, 1789, at 3 h. 55' in the afternoon: but will not be seen again, in this island at least, until the year 1799, May 7th, at 2 h. 34' in the afternoon. In like manner, VENUS sometimes appears as a black spot on the sun, but much more seldom than Mercury. She was thus seen first, in 1639; afterwards in the years 1761 and 1769; but will not again be visible in this manner till the year 1874.

(366.) When the earth is out of the line of the nodes of an inferior planet, its orbit appears an ellipse, more or less excentric according to the situation of the eye of the spectator. In these cases, the motion of Mercury is unequal: faster near the inferior conjunction, but most unequal in the inferior semicircle, going through the unequal spaces into which the ellipse is divided. The motions

motions of the inferior planets, both direct and retrograde, are very unequal: and this inequality proceeds not from the excentricity of their orbits, but from the projection of their orbits into long ellipses; and is therefore a mere optical deception.

(367.) These planets appear stationary while changing their motion from direct to retrograde, or from retrograde to direct. If the earth stood still, the times of their appearing stationary would be at their greatest elongation; for though it be a property of the circle that a straight line can only touch it in one point, yet when the circle is very large, the recess from the tangent is not perceptible for a considerable time. Thus in fig. 11. suppose the earth to be at rest in A, Venus would appear stationary, her geocentric place continuing at T all the while she is going in her orbit from *a* to *b*; because her deviation from the visual line AT would scarce be perceptible so near the point of contact H.

(368.) The inferior planets, therefore, to an inhabitant of the earth, appear always near the sun; alternately going from and returning to him, sometimes in straight lines, at others in elliptical curves, first on one side and then on the other; sometimes so near as to be rendered invisible by his stronger light. Sometimes, when in or near their nodes, they pass behind the sun in their superior semicircles, or pass between him and us; in which case they appear like black spots on his disk, as above mentioned. For the better comprehending of these motions, however, we have hitherto supposed the earth to stand still in some part of its orbit, while they go round the sun in theirs: but as this is not the case, it now remains to consider the changes which take place in consequence of the earth's motion.

(369.) Were the earth to stand still in any part of its orbit, as at A, the places of conjunction, both in the superior and inferior semicircle, as also of the greatest elongation; and consequently, the places of direct and retrograde motion, and of the stations of an inferior planet, would always be in the same part of the heavens. Thus, in Plate XVI. fig. 11. upon this supposition, the places of Mercury's stations would always be the points P and R, the arc of his direct motion PR, and of his retrograde motion RP; whereas, on account of the earth's motion, the places where these appearances happen are continually advancing forward in the ecliptic, according to the order of the signs. In fig. 12. let ABCD be the orbit of the earth; *e f g b* that of Mercury, ☉ the sun; GFKI an arc of the ecliptic extended to the fixed stars. When the earth is at A, the sun's geocentric place is at F; and Mercury, in order to a conjunction, must be in the line AF; that is, in his orbit he must be at *f* or *b*. Suppose him to be at *f*, in his inferior semicircle: if the earth stood still at A, his next conjunction would be when he is in his superior semicircles at *b*; the places of his greatest elongation also would be at *e* and *g*, and in the ecliptic at E and G: but supposing the earth to go on in its orbit from A to B, the sun's geocentric place is now at K; and Mercury, in order to be in conjunction, ought to be in the line BK at *m*. As by the motion of the earth, the places of Mercury's conjunctions with

the sun, are thus continually carried round in the ecliptic, in consequence, so the places of his almost elongations must be carried in consequence also. Thus, when the earth is at A, the places of his greatest elongation from the sun are in the ecliptic E and G; the motion of the earth from A to B advances them forward from G to L, and from E to I.

(370.) The geocentric motion of Venus may be explained in a similar manner; only as the motion of Venus is much slower than that of Mercury, his conjunctions, oppositions, elongations, and stations, all return much more frequently than those of Venus.

(371.) To explain the stationary appearances of the planets, it must be remembered, that the diameter of the earth's orbit, and even of that of Saturn, are but mere points in comparison of the distance of the fixed stars; and, therefore, two lines, absolutely parallel, though drawn at the distance of the diameter of Saturn's orbit from each other, would, if continued to the fixed stars, appear to us to terminate in the same point. Let the two circles, Plate XVI. fig. 11. represent the orbits of Venus and of the Earth, let the lines AE, BF, CG, DH, be parallel to SP, we may nevertheless affirm, that if continued to the distance of the fixed stars, they would all terminate in the same point with the line SP. Suppose, then, Venus at E, while the earth is at A, the visual ray, by which she is seen, in the line AE. Suppose again, that, while Venus goes from E to F, the Earth goes from A to B, the visual ray, by which Venus is now seen, is BF, parallel to AE; and therefore, Venus will be all that time stationary, appearing in that point of the heavens where SP extended would terminate: this station is at her changing from direct to retrograde. Again, suppose, when the Earth is at C, Venus at G, and the visual line CG; if, while the earth goes from C to D, Venus goes from G to H, that she is seen in the line GH, parallel to CG, she will be all that time stationary, appearing in the point where a line drawn from S through C would terminate. This station is at her changing from retrograde to direct; and both are in her inferior semicircle.

(372.) An inferior planet, when in conjunction with the sun, in its inferior semicircle, is said to be in PERIGEE, and when in the other to be in APOGEE, on account of its different distance from the Earth. Their real distances from the Earth, when in perigee, are variable, partly owing to the excentricities of their orbits, as well as that of the Earth; and partly owing to the motions of the different bodies, by which it happens that they are in perigee, in different parts of their orbits. The least possible distance is, when the perigee happens at the time that the Earth is in its perihelion, and when the planet is in its aphelion.

(373.) The difference of distance between the Earth and inferior planets, at different times, makes a considerable variation in their apparent diameters, which indeed, is very observable in the planets; and thus, they sometime look considerably larger than at others. This difference of magnitude in Mercury, is nearly as 5 to 1; and

Venus, no less than 32 to 1. Any person, un-
 ilted by instruments, may observe an inferior
 met alternately approach nearer and nearer the
 1, until at last it comes into conjunction with him
 d then recedes farther and farther, till it is at its
 latest elongation, which will be first on one side,
 d then on the other: but, if we observe the ap-
 rent change of place, of an inferior planet, in
 e sphere of the heavens, its direct motions, sta-
 ns, and retrogradations, measuring its diameter
 quently with the micrometer, we shall find, by
 decrease at some times, and increase at others,
 at its distance from us is very considerably va-
 d.

(374.) The apparent paths of Mercury and Ve-
 s as seen from the Earth, are delineated on
 ate XVII. fig. 9. They appear to describe
 ped curves, which are extremely complicated.
 e darkest line represents that of Venus, which
 urns into itself every eighth year. The faintest
 ped curve represents the path of Mercury,
 ich does not return into itself at any assignable
 iod. The double circle, with the months
 rked upon it, represents the apparent path of
 e sun, (for the Earth is here considered as ap-
 rently at rest,) and the outer circle represents
 e ecliptic. The apparent stations and retrogra-
 tions of these planets, are obviously shewn from
 is figure.

(375.) The apparent paths of Mars, Jupiter and
 urn, are given in Pl. XVI. fig. 14. The numbers
 rked on the looped curves, are the years for
 hich the motions are shewn. This figure also
 rves well for shewing the apparent stations, &c.
 the superior planets.

(376.) As the superior planets move in a larger
 bit than the Earth, they can only be in conjunc-
 n with the sun, when they are on that side op-
 site to the Earth; as, on the other hand, they
 e in opposition to him, when the earth is be-
 reen the sun and them. They are in quadrature
 ith him, when their geocentric places are 90°
 stant from that of the sun. In order to under-
 ind their apparent motions, we shall suppose
 em to stand still, in some part of their orbit,
 hile the earth makes a complete revolution in
 rs; in which case, any superior planet would
 en have the following appearances:

(377.) I. While the earth is in her most distant
 micircle, the motion of the planet will be direct.
 . While the earth is in her nearest semicircle, the
 anet will be retrograde. III. While the earth
 ear those places of its orbit, where a line
 awn from the planet, would be a tangent, it
 ould appear to be stationary. Thus, in Plate
 VI. fig. 15. let $a b c d$ represent the orbit of the
 uth; S the Sun: EFG an arc of the orbit of
 piter; ABC an arc of the ecliptic, projected
 the sphere of the fixed stars. Suppose Jupiter
 continue at F, while the earth goes round in
 r orbit, according to the order of the letters
 $a b c d$. While the earth is in the semicircle most
 stant from Jupiter, going from a to b and
 om b to c , his motion in the heavens would
 pear direct, or from A to B; and from B
 C: but, while the earth is in its nearest semi-
 cle $c d e$, the motion of Jupiter would appear
 rograde from C to B; and from B to A; for

a, b, c, d , may be considered as so many diffe-
 rent stations, from whence an inhabitant of the
 earth would view Jupiter at different seasons of
 the year, and a straight line drawn from each of
 these stations, through F the place of Jupiter,
 and continued to the ecliptic, would shew his ap-
 parent place there to be successively at A, B, C,
 B, A. While the earth is near the points of con-
 tact, a and c , Jupiter would appear stationary, be-
 cause the visual ray drawn through both planets,
 does not sensibly differ from the tangent Fa or Fc.
 When the earth is at b , a line drawn from b thro'
 S. and F to the ecliptic, shews Jupiter to be in
 conjunction with the sun at B. When the earth
 is at d , a line drawn from d through S, continued
 to the ecliptic, would terminate in a point oppo-
 site to B; which shews Jupiter then to be in op-
 position to the sun: and thus, it appears, that his
 motion is direct in the conjunction, but retrograde
 when in opposition, with the sun.

(378.) The DIRECT MOTION of a superior pla-
 net is swifter the nearer it is to a conjunction, and
 slower as it approaches to a quadrature with the
 sun. Thus, in fig. 16. let ☉ be the sun; the lit-
 tle circle round it, the orbit of the earth, where-
 of $a b c d e f g$ is the most distant semicircle; OPQ,
 an arc of the orbit of Jupiter; and ABCDEFG,
 an arc of the ecliptic in the sphere of the fixed
 stars. If we suppose Jupiter to stand still at P,
 by the earth's motion from a to g , he would ap-
 pear to move direct from A to G, describing the
 unequal arcs AB, BC, CD, DE, EF, FG, in e-
 qual times. When the earth is at d Jupiter is in
 conjunction with the sun at D, and there his di-
 rect motion is swiftest. When the earth is in th: g
 part of her orbit where a line drawn from Jupiter
 would touch it, as in the points e or g , Jupiter is
 nearly in quadrature with the sun; and the near-
 er the earth is to any of those points, the slower
 is the geocentric motion of Jupiter; for the arcs
 CD and DE are greater than BC or EF, and the
 arcs BC and EF are greater than AB or FG.

(379.) The RETROGRADE MOTION of a superi-
 or planet is swifter the nearer it is to an opposi-
 tion, and slower as it approaches to a quadrature,
 with the sun. Thus, let ☉, fig. 17. be the sun;
 the little circle round it the orbit of the earth,
 whereof $g b i k l m n$ is the nearest semicircle;
 OPQ, an arc of the orbit of Jupiter; NKG an
 arc of the ecliptic: if we suppose Jupiter to stand
 still at P, by the earth's motion from g to n , he
 would appear to move retrograde from G to N,
 describing the unequal arcs GH, HI, IK, KL,
 LM, MN, in equal times. When the earth is at
 k , Jupiter appears at K, in opposition to the sun,
 and there his retrograde motion is swiftest. When
 the earth is either at g or n , the points of contact
 of the tangents Pg and Pn, Jupiter is nearly in
 quadrature with the sun: and the nearer he is to
 either of these points, the slower is his retrograda-
 tion; for the arcs IK and KL are greater than HI
 or LM: and the arcs HI and LM are greater than
 GH or MN. Since the direct motion is swiftest
 when the earth is at d , and continues diminishing
 till it changes to retrograde, it must be insensible
 near the time of change: and, in like manner, the
 retrograde motion being swiftest when the earth
 is in k , and diminishing gradually till it changes

east, it causes an apparent diurnal motion of the heavenly bodies from east to west. By this sid motion of the earth on its axis, the inhabitants about the equator are carried 1042 miles every hour, whilst those on the parallel of London are carried only about 580, besides the 68,000 miles by the annual motion above mentioned, which is common to all places whatever.

(387.) A variety of circumstances afford the clearest evidence, that the earth is of a globular figure. I. When we are at sea on board a ship, it may be out of sight of land, when the land is far enough to be visible, if it were not hid from our eye by the convexity of the water. Thus, ABCD, *fig. 10. Plate XVII*, represent a portion of the globe of our earth. Let M be the top of a mountain; this cannot be seen by a person on board the ship at B, because a line drawn from M to his eye at E is intercepted by the convexity of the water; but let the ship come to C, then the mountain will be visible, because a line may be drawn from M to his eye at E. II. The higher the eye, the farther will the view be extended. It is very common for sailors from the top of the mast of a ship to discover land or ships at a much greater distance than they can do when they stand upon deck. III. When we stand on shore, the highest part of a ship is visible at the greatest distance. If a ship is going from us out to sea, we still continue to see the mast after the hull or body of the ship disappears, and the top of the mast will continue to be seen the longest. If a ship is coming towards us, the top of the mast comes first in view, and we see more and more till at last the hull appears. If the surface of the sea were a flat plain, a line might be drawn from any object situated upon it, as the ship D, *fig. 11.* to the eye, whether placed high or low, at A or B. In this case, any object upon the earth or sea would be visible at any distance which was not so great as to make the appearance of it too faint, or the angle under which it appears too small, to be seen by us. An object would be visible at the same distance, whether the eye were high or low. Not the highest, but the largest, objects would be visible to the greatest distance, so that we should be able to see the bulk of a ship farther off than the mast.

(388.) IV. Several navigators, such as Ferdinand Magellan, Sir Francis Drake, Lord Anson, Captain Cook, &c. have sailed round the globe; not in an exact circle, the land preventing them, but by going in and out as the shores happened to lie. V. All the appearances in the heavens are the same, whether at land or sea. VI. Eclipses of the moon arise from the shadow of the earth, which is always circular. Although the earth presents, during several hours, different portions of its surface to the sun, yet still the shadow is round. The small inequalities upon the surface of the earth bear no kind of proportion to its magnitude sufficient to alter the appearance of its shadow.

(389.) VII. The globular figure of the earth is also inferred from the operation of levelling, in which it is found necessary, to make an allowance for the difference between the apparent and true level.

(390.) The earth's axis makes an angle of $23\frac{1}{2}^{\circ}$

with the axis of its orbit, and its position at any time is parallel to its position at any other time. Thus it points always to the same quarter of the heavens, throughout its annual course. That the earth moves round the sun, may be proved, beyond a doubt, by the following arguments.

(391.) I. The sun is found by the most accurate observations, to be immensely bigger than the earth; for his diameter, as seen by us, subtends an angle of more than $30'$, but it is certain, that the earth, were it seen from the sun, would not subtend a greater angle than $17''$. If, therefore, the sun be formed of materials not very much rarer than the earth, (and there is no reason to believe, that it is much less dense,) the quantity of matter in the sun, must far exceed the whole mass of matter in all the planets; and to suppose, that gravity retains all the other planets in their orbits, without affecting the earth, would be as absurd as to suppose, that 6 cannon bullets might be projected up to different heights in the air, and that 5 of them should fall to the ground, but that the 6th, though neither the highest nor the lowest, should remain suspended in the air without falling, and the earth move round it.

(392.) There is no such thing in nature as a heavy body moving round a light one as its centre of motion. A pebble fastened to a mill-stone by a string, may, by an easy impulse, be made to circulate round the mill-stone: but no impulse can make a mill-stone circulate round a loose pebble; for the mill-stone would go off, and carry the pebble along with it. The sun is so very much bigger and heavier than the earth, that, if he were moved out of his place, not only the earth, but all the other planets, if they were united into one mass, would be carried along with him as the pebble would be with the mill-stone.

(393.) II. The celestial motions become exceedingly more simple, and free of those looped contortions which must be supposed in the other case; and which are extremely improbable and incompatible with what we know of motion; as the reader may easily judge, from viewing *fig. 14. Plate XVI*, and *fig. 9. Plate XVII*, where the earth is considered as at rest, while the sun moves round it, and the planets are supposed to move in circular, or rather elliptical orbits round the sun.

(394.) III. If the earth revolve round the sun, then the analogy, between the squares of the periodic times and the cubes of the distances, will obtain in all the bodies which circulate round a common centre; whereas this will not be the case with respect to the sun and moon, if both turn round the earth.

(395.) IV. Besides these, other proofs might be given; but the most complete proof of all, and which indeed amounts to a demonstration is, the aberration of the fixed stars, arising from the progressive motion of light, combined with the earth's annual motion round the sun; a discovery made by Dr BRADLEY, and one of the finest in modern astronomy.

(396.) By frequent observations of the eclipses of Jupiter's satellites, it is found, that light is about 8 minutes in moving from the sun to the earth. And since the earth describes about 1 degree, or

[illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible][illegible]

(402.) The strongest objection, that can be made against the earth's moving round the sun like the other planets, is, that, in opposite points of the earth's orbit, its axis, which always keeps a parallel direction, would point to different fixed stars; which is not found to be fact. But this objection is easily removed, by considering the immense distance of the stars in respect of the diameter of the earth's orbit; the latter being no more than a point when compared to the former. If we lay a ruler on the side of a table, and along the edge of the ruler view the top of a spire at ten miles distance; then lay the ruler on the opposite side of the table in a parallel situation to what it had before, and the spire will still appear along the edge of the ruler; because our eyes, even when assisted by the best instruments, are incapable of distinguishing so small a change at so great a distance. As the apparent places of the stars, therefore, correspond with this theory, the motion of the earth and the motion of light are both determined.

(403.) In fact, we find that the sun, and those planets on which there are visible spots, turn round their axes: for the spots in general move regularly over their disks, allowing for the variations already taken notice of. Hence we may reasonably conclude, that the other planets, on which we see no spots, and the earth, which is likewise a planet, have such rotations. But being incapable of leaving the earth to view it at a distance, and its rotation being smooth and uniform, we can neither see it move on its axis as we do the planets, nor feel ourselves affected by its motion. Yet there is one effect of such motion, which will enable us to judge with certainty whether the earth revolves on its axis or not.

(404.) All globes which do not turn round their axes, will be perfect spheres, on account of the equality of the weight of bodies on their surfaces; specially of the fluid parts. But all globes, which turn on their axes, will be oblate spheroides; that is, their surfaces will be higher or farther from the centre in the equatorial than in the polar regions: for, as the equatorial parts move quickest, they will recede farthest from the axis of motion, and enlarge the equatorial diameter. That our earth is really of this figure, is demonstrable from the unequal vibrations of a pendulum, and the unequal lengths of degrees in different latitudes.—Since then, the earth is higher at the equator than at the poles, the sea, which naturally runs downward, or toward the places which are nearest the centre, would run towards the polar regions, and leave the equatorial parts dry, if the centrifugal force of these parts, by which the waters were carried thither, did not keep them from returning. The earth's equatorial diameter is 36 miles longer than its axis.

(405.) It is found that bodies near the poles are heavier than those towards the equator, because they are nearer the earth's centre, where the whole force of the earth's attraction is accumulated. They are also heavier, because their centrifugal force is less, on account of their diurnal motion being slower. For both these reasons, bodies carried from the poles towards the equator gradually lose their weight. Experiments prove, that a pen-

dulum, which vibrates seconds near the poles, vibrates slower near the equator, which shows that it is lighter or less attracted there. To make it oscillate in the same time, it is found necessary to diminish its length. By comparing the different lengths of pendulums swinging seconds at the equator and at London, it is found that a pendulum must be $2\frac{1}{8}\frac{2}{8}$ lines (or 12th parts of an inch) shorter at the equator than at the poles.

(406.) A person on the earth can no more be sensible of its undisturbed motion on its axis, than one in the cabin of a ship on smooth water can be sensible of the ship's motion, when it turns gently and uniformly round. It is therefore no argument against the earth's diurnal motion, that we do not feel it; nor are the apparent revolutions of the celestial bodies every day, a proof of the reality of these motions; for whether we or they revolve, the appearance is the very same. A person looking through the cabin windows of a ship, as strongly fancies the objects on land to go round when the ship turns, as if they were actually in motion.

(407.) The other common objections against the earth's motion on its axis, are easily answered. Some imagine, that if the earth turns eastward, as it certainly does, if it turns at all, a ball fired perpendicularly upward in the air, should fall considerably westward of the place it was projected from. This objection will be found to have no weight, if we consider that the gun and ball partake of the earth's motion; and therefore the ball, being carried forward with the air as quick as the earth and air turn, must fall down on the same place. A stone let fall from the top of a main-mast, if it meets with no obstacle, falls on the deck as near the foot of the mast when the ship sails as when it does not.

(408.) As for those scriptural expressions which seem to contradict the earth's motion, this general answer may be made to them all, that, The scriptures were never intended to instruct us in philosophy or astronomy; and therefore on those subjects, expressions are not always to be taken in the literal sense, but for the most part as accommodated to the common apprehensions of mankind. Men of sense in all ages, when not treating of the sciences purposely, have used common language; and it would be absurd to adopt any other in addressing the majority of mankind.

(409.) The annual motion of the earth has been effectually confirmed by an argument drawn from the progressive motion of light; and from the same consideration the truth of the diurnal motion may be completely established.

(410.) In consequence of the progressive motion of light, the apparent place of a fixed star is east of its true place, and the difference is proportional to the cosine of the star's declination; this displacement of the fixed stars has changed, because of the precession of the equinoctial points. Therefore, if the diurnal revolution of the heavens were a real motion, the whole heavens must have changed their appearance; and the respective positions of the stars must be very different now, from what they were in the time of Hipparchus. A star which is now near the vernal equinox must have changed its apparent distance, at least 5° from a-

Another ecliptical star which is 60° east from it. Nay it is highly probable, that no zodiacal star could be ever visible; such would have been the direction that the rays of light must have taken, because of their own proper motion being compounded with that of the star, whose velocity must have been exceedingly great, by reason of its distance from the poles of the motion. But since no such remarkable displacement of the stars has been observed, we may conclude, that the cause which would have produced it, has no existence; and that the revolution of the heavens is not a *real*, but only an *apparent* motion.

(411.) The ANNUAL and DIURNAL MOTIONS of the earth, together with the different lengths of days and nights, and all the beautiful variety of seasons, depending on those motions, may be thus illustrated.

(412.) In PLATE XVII. fig. 1. let F G H I be the earth; O its centre; and let it revolve about an axis perpendicular to the plane of the figure, in the order I F G H; that is, from west to east. Let A be the sun, draw A F O H C, and G O J perpendicular to it; let a spectator be at I; then since the tangent at I (which represents the horizon) will be parallel to A F H, and A at an immense distance; they will nearly meet in A, and the sun at A will be rising in the horizon at I. As the earth moves round, the spectator is carried towards F, and the sun at A seems to rise higher and higher; and when the spectator is arrived at F, then the sun is at the highest. As the earth still turns round, and the spectator is carried from F towards G, the sun appears to descend, as if it moved towards D; and when the spectator is arrived at G, then the sun appears in the tangent at G; that is, in the horizon at G; and therefore the sun is setting. Afterwards, all the time the spectator is moved through G H I, the sun appears under the horizon, till it comes at I, where the sun seems to rise again.

(413.) Thus it is evident, that while the spectator is carried through the illuminated half of the earth I F G, it is day light; at the middle point F, it is noon-day; at the dark hemisphere G H I, it is night; and at H, it is midnight. And thus the vicissitude of day and night appears, by the rotation of the earth about its axis. What has been said of the sun, is equally true of the moon, or any star placed at A. And therefore all the celestial bodies seem to rise and set by turns, one after another, according to their various situations. For let A, B, C, D be four stars: when the spectator is at I, the star A rises; and when at G, it sets. When the spectator is at F, B rises; and when it is at H, it sets. When he is at G, C rises; and when at I, it sets. When the spectator is at H, D rises; and when at F, it sets.

(414.) Hence it is the very same thing, as to the diurnal motions, WHETHER THE EARTH MOVES uniformly about its axis, while the HEAVENS STAND STILL; or whether the HEAVENS MOVE uniformly round, while the EARTH STANDS STILL; the phenomena being exactly the same either way. For whether the spectator moves up the arch I F; from west to east, whilst A moves uniformly in the arch A D, it, whilst I is fixed; the same angle

will be described, and therefore the altitude of A, above the horizon, will be the same either way.

SECT. III. Of the SEASONS.

(415.) To explain the causes of the various seasons, see PLATE XVII. fig. 2. and supply \triangle in the middle of the dark circle E N Q A. Let γ \triangle γ be the earth's orbit, and S the sun. This orbit is so small in respect to the distance of the fixed stars, that the same aspect of the heavens will appear, whether a man be placed in the earth or in the sun. If the earth be at γ , a spectator will see the sun in \triangle ; when the earth comes to δ , he will see the sun in m ; and the sun will appear to have moved through $\triangle m$. Whilst the earth is moving to Π , the sun will seem to pass through m γ ; and a person in the earth observes the sun to go through the same space in the heavens, that a spectator at the sun would see the earth go through: and as he is not sensible of the earth's motion, he ascribes that motion to the sun, which in reality is unmoved. Hence, because the relative motion is the same, whether of the two moved, and all effects are the same as to their places; astronomers generally suppose the sun to move along the ecliptic, describing its orbit round the earth at rest.

(416.) Let N E A Q be the earth, N A be its axis, N the north pole, A the south; E Q the equinoctial, and P R a parallel of latitude passing through any place. Draw a plane G γ I perpendicular to γ S γ , which divides the illuminated hemisphere from the dark one. The axis N A is inclined to the plane of the ecliptic or earth's orbit, in an angle of $66\frac{1}{2}$ degrees: and during the earth's motion in its orbit, the axis always remains in a parallel position, or pointing to the same star. The earth also moves uniformly round this axis; and describes equal arches in equal times. Now let the earth be at \triangle : in this position, the circle dividing the light and dark hemispheres passes through the poles N and A, and divides all the parallels as P R into two equal parts; therefore any point in that parallel, as the earth revolves round, will stay as long in the light hemisphere as in the dark; that is, the days and nights are equal. As it moves to m , the pole N comes into the light hemisphere by reason of the oblique position of the axis N A; and as it proceeds to γ and γ , the light hemisphere reaches farther and farther beyond N. At coming to γ , it is at the farthest, reaching to G, and making the arch N G $23\frac{1}{2}$ degrees, the complement of N γ S, or $66\frac{1}{2}$ degrees. Then the opposite pole A is as far involved in the dark hemisphere; whence in north latitudes, or in the hemisphere E N Q the days have been increasing from \triangle to γ , where they are at their longest: for the greater part of the parallel P R is in the illuminated hemisphere, and the smaller part in the dark.

(417.) In the opposite or southern hemisphere the days have been decreasing, and are at their shortest when the earth is at γ : for all parallels to E Q have their greater part in the dark hemisphere. If through the point G a parallel be described, this parallel is called the *arctic circle*; and all the space contained therein is illuminated, and that

ere is no night, when the earth is at ν . For the same reason, the space within a parallel drawn rough I , will be all dark, and all is night there. a parallel be drawn through B , where $S \nu$ cuts the arch NE , that parallel is called the *tropic of cancer*; and then the sun will shine perpendicular on the inhabitants in that parallel. This is the summer season for those that are in the hemisphere NQ , and the winter for those that live in EAQ ; and since EQ is equally divided by the circle of light and darkness GI , the days and nights are always equal under the equinoctial.

(418.) While the earth moves through ∞ and to φ , the circle of light and darkness comes nearer and nearer to the pole N , the angle $N \nu$ and consequently $B \nu E$ grows less and less, till they vanish in φ ; then the circle of light and darkness passes again through the poles N and A , affecting all the parallels as PR ; and the days and nights are again equal, all over the earth.

(419.) While the earth moves through φ , δ , ϵ , to ∞ , the sun seems to go through ∞ , m , f , ν ; and the circle separating light and darkness falls short more and more of the north pole A ; and goes further and further beyond the south pole A ; whence the parallels cut by that circle will have the greater part in the dark, in the north hemisphere; but in the south hemisphere, the greater part will be in the light: and it is winter in the northern hemisphere ENQ , the days being the shortest; and summer to the southern hemisphere EAQ , their days being at their longest. Within the parallel drawn through G , there will be no day whilst the earth is at ∞ ; and in the parallel drawn through I , there will be no night. At the pole A it will be day for 6 months, and at the pole N it will be night for 6 months; just the contrary of what happens when the earth is at ν . In this position, if a parallel be drawn through B , the sun will shine perpendicular to the earth in that parallel, and it is called the *tropic of Capricorn*; and a parallel drawn through I is called the *antarctic circle*.

(420.) When the earth moves from ∞ through ϵ and m to ∞ again; it is evident the circle separating light and darkness draws nearer and nearer to the poles N and A , by which the light and dark parts of the parallels become nearer an equality, and so to the days and nights. Therefore in the north hemisphere ENQ , the days are increasing; and in the south hemisphere they are decreasing: and the days and nights become equal in every place, when the earth arrives at ∞ .

(421.) In this manner are the several seasons caused, being owing to the obliquity of the axis of rotation of the earth, to the plane of the earth's orbit. But if the axis was perpendicular to it, there could be no variety in the length of days, in whatever part of the orbit the earth was; and all seasons would be alike. Thus the **OBLIQUITY** of the **EARTH'S AXIS** to the **ECLIPTIC**, or which is the same thing, of the **EQUINOCTIAL** to the **ECLIPTIC**, is the **CAUSE** of the different seasons, summer, winter, spring, and autumn during the year. Without this, there could be no difference of seasons; and consequently it could not be easy to know the length of the year, without observations of the stars. For the length of the year is known from

finding the time by observation, when the sun is in the equinoctial points; and there being no such points to observe by, there could be no method but to observe by the position of the stars, when the same star was again in opposition to the sun, which none but an astronomer could do.

(422.) The sun appears 47 degrees **HIGHER** in the summer tropic, than it does in the winter tropic; for in summer it seems to have ascended through the arch BE ; and in winter, to have descended through the arch BQ equal to BE ; and their sum is 47 degrees.

(423.) All these phenomena may be thus represented: Take a small globe that has the equinoctial and parallels drawn on it; and placing a candle upon a table move the globe round the candle in a circle parallel to the table, so that the axis of the equator may be oblique to that circle, and be kept always in a parallel position whilst it moves about. The candle will illuminate the globe as it is carried round, just as the sun does the earth in its orbit; and the poles and the parallels will be the same way affected with light and darkness as the globe.

(424.) The orbit of the earth being elliptical, and the sun constantly keeping in its lower focus, which is 1,617,941 miles from the middle point of the longer axis, the earth approaches twice as near, or 3,235,882 miles nearer the sun at one time of the year than at another; for the sun appearing under a larger angle in our winter than summer, proves that the earth is nearer the sun in winter. But here this question naturally arises, Why have we not the hottest weather when the earth is nearest the sun? In answer it must be observed, that the excentricity of the earth's orbit, or 1,617,941 miles, bears no greater proportion to the earth's mean distance from the sun, than 17 does to 1000; and therefore this small difference of distance cannot occasion any great difference of heat or cold.

(425.) But the principal cause of this difference is, that in winter the sun's rays fall so obliquely upon us, that any given number of them is spread over a much greater portion of the earth's surface where we live; and each point must then have fewer rays than in summer. There comes also a greater degree of cold in the long winter nights than there can return of heat in so short days; and on both these accounts the cold must increase. In summer the rays fall more perpendicularly upon us; come with greater force, and in greater numbers, on the same place; and by their long continuance, a much greater degree of heat is imparted by day, than can fly off by night.

(426.) Besides, those parts which are once heated, retain the heat for some time; which, with the additional heat daily imparted, makes it continue to increase though the sun declines towards the south. This is the reason why July is hotter than June, and often, in our cold climate, August hotter than both, although the sun has withdrawn from the summer tropic; as we find it is generally hotter at 3 in the afternoon, when the sun has gone towards the west, than at noon when he is in the meridian. Those places too which have been well cooled require time to be heated again; for the sun's rays do not heat even the surface

surface of any body, till they have been some time upon it. Hence we find January for the most part colder than December, although the sun has withdrawn from the winter tropic, and begins to dart his beams more perpendicularly upon us. An iron bar is not heated immediately upon being put into the fire, nor grows cold till some time after it has been taken out.

(437.) The sun completes what is called a TROPICAL YEAR, when he arrives at the same equinoctial or solstitial point. This he does in 365 days, 5 hours, 48 minutes, 57 seconds. When he arrives at the same fixed star again, as seen from the earth, he completes the SIDERAL YEAR, which contains 365 days, 6 hours, 9 minutes, 24 seconds. The fiducial year is therefore 20 minutes 17 seconds longer than the four or tropical year, and 9 minutes 14 seconds longer than the Julian or civil year, which we date at 365 days 6 hours, so that the civil year is almost a mean between the fiducial and tropical.

(438.) As the sun describes the whole ecliptic, or 360°, in a tropical year, he moves 59' 8" of a degree every day at a mean rate; and consequently 30° of a degree in 20 minutes 57 seconds of time: therefore he will arrive at the same equinox or solstice, when he is 30° of a degree short of the same star or fixed point in the heavens, from which he set out the year before. So that, with respect to the fixed stars, the sun and equinoctial points fall back (as it were) 30° in 2160 years, which will make the stars appear to have gone 30° forward with respect to the signs of the ecliptic in that time: for the same signs always keep in the same points of the ecliptic, without regard to the constellations.

(439.) The anticipation of the equinoxes, and consequently of the seasons, is not owing to the precession of the equinoctial and solstitial points in the heavens, (which can only affect the apparent motions, places, and declinations, of the fixed stars); but to the difference between the civil and solar year, which is 21 minutes 3 seconds; the civil year containing 365 days 6 hours, and the solar year 365 days 5 hours 48 minutes 57 seconds.

(440.) These 21 minutes 3 seconds, by which the civil or Julian year exceeds the solar, amount to 11 days in 1435 years; and so much our seasons had fallen back, with respect to the days of the months, since the time of the Nicene council in A. D. 325. In order, therefore, to bring back all the fasts and festivals to the days then settled, it was requisite to suppress 11 nominal days; and that the same seasons might be kept to the same times of the year, in future, to leave out the bissextile day in February at the end of every century of years not divisible by 4, to reckon them only by common years, as the 17th, 18th, and 19th centuries, viz. the years 1700, 1800, 1900, &c. because a day intercalated every fourth year was too much; and to retain the bissextile day at the end of those centuries of years which are divisible by 4, as the 16th, 20th, and 24th centuries, viz. the years 1600, 2000, 2400, &c.

(441.) Without these changes, the seasons in length of time, would be quite reversed with regard to the months of the year; though it would

have required near 25,000 years to have brought them to the same state as at present. If the earth had not exactly 365½ diurnal rotations on its axis, when it revolved from any equinoctial or solstitial point to the same again, the civil and solar years would always have kept pace together, and the seasons would never have needed any alteration.

SECT. IV. Of the Phenomena of the Moon.

(435.) The moon is not a primary planet, but only a satellite, or attendant of the earth, orbiting around it in 29 days, 12 hours, and 44 minutes, and round the sun along with it every month. The moon's diameter is 2180 miles; and her distance from the earth's centre is 240,000. She goes round her orbit in 27 days, 7 hours, 43 minutes, moving about 1300 miles every hour. She turns round her axis exactly in the time that she goes round the earth, which is the reason of her keeping always the same side towards us, so that her day and night takes together as long as our lunar month.

(436.) The moon is an opaque globe like the earth, and shines only by reflecting the light of the sun; therefore, whilst that half of her which is towards the sun is enlightened, the other must be dark and invisible. Hence the darkness when she comes between us and the sun, and her dark side is then towards us. When she goes a little way forward, we see a little of her enlightened side: which increases to our view as she advances, until she comes to be opposite the sun, when her whole enlightened side is towards the earth, and she appears a round illuminated orb, which we call the full moon. Her dark side being then turned away from us. From the full she seems to decrease gradually, she goes through the other half of her disc, showing us less and less of her enlightened side every day, till her next change or conjunction with the sun, when she disappears as before.

(437.) The moon has fewer very distinct features, her axis being almost perpendicular to the ecliptic. What is very singular, one half of her has no darkness at all; the earth casting a strong light on the sun's disk, while the other half has a fortnight's darkness, a fortnight's light by turns.

(438.) Our earth appears as a moon to the inhabitants of the moon, waxing and waning regularly, but appearing 13 times as big, and affording 13 times as much light, as she does to us. The changes to us, the earth appears full twice, and when she is in her first quarter to us, she is in her third quarter to her; and vice versa. But from one half of the moon the earth is seen at all: from the middle of the other half it is always seen over head; twining round the earth 30 times as quick as the moon does. From the circle which limits our view of the moon, one half of the earth's side next her is lost, the other half being hid below the horizon of the earth on that circle. To her inhabitants the earth appears the biggest body in the universe; it appears 13 times as big as she does to us.

(439.) While the earth turns round its axis, several continents, seas, and islands, appear to the moon's inhabitants like so many spots of

light and dark, but much fairer, and more numerous, than our clouds. The Lunarians see the earth's diurnal rotation of the sun, and the motions of the planets, which we have a more true

idea of, than we have of our own. The axis of the earth, to the Lunarians, is as truly visible from the earth, as our axis is visible from the sun, and as the earth is visible from her equator, so the sun is visible from the earth's pole. Hence the Lunarians see the number of days, and the length of night in the earth.

The inhabitants of the earth, may see the moon, as easily as we see the sun, and the earth keeps the same distance of place from the sun, as we do from the earth. The moon is in the same part of the sun's disk, as the sun is in the earth's disk, and with her own light, she is as bright as the sun, and is as big as the sun, and is as near to the earth, as the sun is to the earth. The moon is in the same part of the sun's disk, as the sun is in the earth's disk, and with her own light, she is as bright as the sun, and is as big as the sun, and is as near to the earth, as the sun is to the earth.

rent forms and brightness, moving over its surface; but much fainter at some times than others, according as our clouds cover them. By these observations the Lunarians can determine the time of the earth's diurnal motion, just as we do the motion of the sun: and they may measure their time by the motion of the earth's spots, for they cannot have a more true dial.

(437.) The axis of the moon is so nearly perpendicular to the ecliptic, that the sun never revolves sensibly from her equator; and the obliquity of her orbit, which is next to nothing as seen from the sun, cannot cause the sun to decline sensibly from her equator. Yet her inhabitants are not destitute of means for ascertaining the length of their year, though their method must differ from ours. We know the length of our year by the return of our equinoxes; but the Lunarians, having always equal day and night, must have recourse to another method; and we may suppose, they measure their year by observing when either of the poles of our earth begins to be enlightened, and the other to disappear, which always happens at our equinoxes: they being conveniently situated for observing great tracts of land about our earth's poles, which are entirely unknown to us. Hence we may conclude, that the year is of the same absolute length to the inhabitants of the earth and moon, though very different as to the number of days; we having $365\frac{1}{4}$ natural days, and the Lunarians only $12\frac{7}{8}$, every day and night in the moon being as long as $29\frac{1}{2}$ in the earth.

(438.) The inhabitants of the moon on the side next the earth, may find the *longitude* of their places, as easily as we can find the *latitude* of ours. For the earth keeping constantly, or very nearly so, over one meridian of the moon, the east or west distances of places from that meridian are as easily found as we can find our distance from the equator by the altitude of our celestial poles.

(439.) As the sun only enlightens that half of the earth which is towards him, and leaves the opposite half in darkness, he does the same to the moon, but with this difference, that as the earth is surrounded by an atmosphere, we have twilight after the sun sets; but if the moon has neither an atmosphere of her own, nor is included in that of the earth, (as is supposed) the Lunarians must have an immediate transition from the brightest sunshine to the blackest darkness.

(440.) The moon being an opaque spherical body (for her hills take off no more from her roundness, than the inequalities on the surface of an orange take off from its roundness,) we can only see that part of the enlightened half, which is towards the earth. And therefore, when the moon is at A, See *Plate XVII. fig. 3.* in conjunction with the sun S, her dark half is towards the earth, and she disappears, as at *a*, there being no light on that half to render it visible. When she comes to her *first* *quadrant* at B, or has gone an eighth part of her orbit from her conjunction, a quarter of her enlightened side is towards the earth, and she appears horned, as at *b*. When she has gone a quarter of her orbit from between the earth and sun to C, she shows us one half of her enlightened side, as at *c*, and we say, she is a *quarter* old. At

D, she is in her *second* *quadrant*; and by showing us more of her enlightened side, she appears gibbous, as at *d*. At E, her whole enlightened side is towards the earth; and therefore she appears round, as at *e*, when we say it is *full moon*. In her *third* *quadrant* at F, part of her dark side being towards the earth, she again appears gibbous, and is on the decrease, as at *f*. At G, we see just one half of her enlightened side; and she appears half decreased, or in her third quarter, as at *g*. At H, we only see a quarter of her enlightened side, being in her *fourth* *quadrant*; where she appears horned, as at *h*. And at A, having completed her course from the sun to the sun again, she disappears; and we say it is new moon. Thus, in going from A to E, the moon seems continually to increase; and in going from E to A, to decrease in the same proportion; having like phases at equal distances from A to E, but as seen from the sun S she is always full.

(441.) The moon does not appear perfectly round, when she is full in the highest or lowest part of her orbit, because we have not a full view of her enlightened side at that time. When full in the highest part of her orbit, a small deficiency appears on her lower edge; and the contrary when full in the lowest part of her orbit.

(442.) From the figure, it is evident, that when the moon changes to the earth, the earth appears full to the moon; and *vice versa*. For when the moon is at A, new to the earth, the whole enlightened side of the earth is towards the moon; and when the moon is at E, full to the earth, its dark side is towards her. Hence a *new moon* answers to a *full earth*, and a *full moon* to a *new earth*. The quarters are also reversed to each other.

(443.) The position of the moon's cusps, or a right line touching the points of her horns, is very differently inclined to the horizon, at different hours of the same days of her age. Sometimes she stands, as it were, upright on her lower horn, and then such a line is perpendicular to the horizon: when this happens, she is in what the astronomers call *the nonagesimal degree*; which is the highest point of the ecliptic above the horizon at that time, and is 90 degrees from both sides of the horizon, where it is then cut by the ecliptic. But this never happens when the moon is on the meridian, except when she is at the very beginning of Cancer or Capricorn.

(444.) It is easy to demonstrate, that the moon turns round her axis in the time that she goes round her orbit; for, a spectator at rest, without the periphery of the moon's orbit, would see all her sides turned regularly towards him in that time. She turns round her axis from any star to the same star again in 27 days 8 hours; from the sun to the sun again in $29\frac{1}{2}$ days: the former is the length of her sidereal day, and the latter the length of her solar day. A body moving round the sun would have a solar day in every revolution, without turning on its axis; the same as if it had been at rest, and the sun moved round it: but without turning round its axis it could never have one sidereal day, because it would always keep the same side towards any particular star.

(445.) If the earth had no annual motion, the moon

moon would go round it so as to complete a lunation, a sidereal, and a solar day, all in the same time. But, because the earth goes forward in its orbit, while the moon goes round the earth on her orbit, the moon must go as much more than round her orbit, from change to change in completing a solar day, as the earth has gone forward in its orbit during that time, *i. e.* almost a twelfth part of a circle. If the earth had no annual motion, the moon's motion round the earth, and her track in open space, would be always the same. But as the earth and moon move round the sun, the moon's real path in the heavens is very different from her visible path round the earth, the latter being in a progressive circle, and the former in a curve of different degrees of concavity, which would always be the same in the same parts of the heavens, if the moon performed a complete number of lunations in a year without any fraction.

(446.) To illustrate this, let the nail in the end of the axle of a chariot wheel represent the earth, and a pin in the nave the moon. If the body of the chariot be propped up so as to keep that wheel from touching the ground, and the wheel be then turned round by hand, the pin will describe a circle both round the nail and in the space it moves through. But if the props be taken away, the horses put to, and the chariot driven over a piece of ground which is circularly convex; the nail in the axle will describe a circular curve, and the pin in the nave will still describe a circle round the progressive nail in the axle, but not in the space through which it moves. In this case, the curve described by the nail will resemble in miniature as much of the earth's annual path round the sun, as it describes whilst the moon goes as often round the earth as the pin does round the nail: and the curve described by the pin will have some resemblance of the moon's path during so many lunations.

(447.) The surface of the moon being uneven, some are surprised that her edge does not appear jagged, as well as the curve bounding the light and dark places. But if we consider, that what we call the *edge* of the moon's disk is not a single line set round with mountains, in which case it would appear irregularly indented, but a large zone, having many mountains rising behind one another from the observer's eye, we shall find that the mountains in some rows will be opposite to the vales in others; and thus fill up the inequalities so as to make her appear quite round, just as when one looks at an orange, although its roughness be very discernible on the side next the eye, especially if the sun or a candle shines obliquely upon that side, yet the line terminating the visible part still appears smooth and even.

SECT. V. Of the TIDES.

(448.) The TIDES are found to follow periodically the course of the sun and moon, and hence it has been suspected, in all ages, that the tides were somehow produced by the influence of these luminaries. Of this, Ptolemy, Macrobius and others, seem to have had some knowledge. The celebrated KEPLER formed some conjectures long ago, as to the true cause of the tides. "If,

says he, the earth ceased to attract its waters, and flow into the ocean would be the moon's attraction extends to our earth and up the water." What Kepler only surmised, has been completely verified in the theory last deduced by Newton, and by Halley, from his principles. The principal phenomena of the tides are as follow:

(449.) I. The sea is observed to flow for about 6 hours from low to high, gradually rising, and after a flux of about 6 hours, it flows to rest for a quarter of an hour; and then it ebbs or returns back again from high to low for about 6 hours more. Then after a seeming pause of about $\frac{1}{2}$ of an hour, the sea again begins to flow, and so on alternately.

(450.) II. Hence the sea ebbs and flows twice a day, but falling every day later and later, being on an average about 12 h. 44 min. and double of each 24 h. 48 min. which is the period of a lunar day, or the time between the moon's rising a meridian, and coming to it again. In the tropics, both the arch above the horizon, and below it, and ebbs as often as the tides rise, and both on the eastern and western side. The phenomena are the most obvious appearances. The

(451.) III. The elevation towards the equator exceeds the opposite one a little, and the quantity of the ascent of the water is diminished towards the poles.

(452.) IV. The sun raises and depresses the water twice every day, in the same manner that the moon does; but the solar tides are much less than the lunar ones, although subject to the same variations of the sun and moon, are not dissimilar, but compounded; and thus they form to appearance, one united tide, which increasing and decreasing, produces *NEAP* and *SPRING* tides.

(453.) V. The tides which depend upon the action of both luminaries concur, and the sea is more elevated; but the sea ascends less at the quadratures; for where the water is raised by the action of the moon, it is depressed by the sun, and vice versa. Therefore, when the moon passes from the syzygy to the quadrature, the daily elevations are continually diminishing on the contrary, they are increased, when the moon passes from the quadrature to the syzygy. At the new moon also, *ceteris paribus*, the tides are greater; and those that follow on the same day, are more different than those at full moon.

(454.) VII. The greatest elevations and depressions take place on the day of the new or full moon, and they are the greatest nearest the luminaries are to the plane of the equator; being greatest in the syzygy, and least at the equinoxes.

(455.) VIII. The actions of the sun and moon are greater the nearer those bodies are to the earth; and the greatest tides happen, when the sun is a little to the south of the equator, but does not happen regularly every year.

SECT. V.

Some remarks on the moon's motion.

Section IV. T

Section V. T

Section VI. T

Section VII. T

Section VIII. T

Section IX. T

Section X. T

Section XI. T

Section XII. T

Section XIII. T

Section XIV. T

Section XV. T

Section XVI. T

Section XVII. T

Section XVIII. T

Section XIX. T

Section XX. T

Section XXI. T

Section XXII. T

Section XXIII. T

Section XXIV. T

Section XXV. T

Section XXVI. T

Section XXVII. T

Section XXVIII. T

Section XXIX. T

Section XXX. T

Section XXXI. T

Section XXXII. T

Section XXXIII. T

Section XXXIV. T

Section XXXV. T

Section XXXVI. T

Section XXXVII. T

Section XXXVIII. T

Section XXXIX. T

Section XL. T

Section XLI. T

Section XLII. T

Section XLIII. T

Section XLIV. T

Section XLV. T

Section XLVI. T

Section XLVII. T

Section XLVIII. T

Section XLIX. T

Section L. T

some variation may arise from the situation of the moon's orbit, and the distance of the syzygy from the equinox.

(457.) IX. The mean force of the moon, to move the sea, is to that of the sun nearly as $4\frac{1}{2}$ to 1; and therefore if the action of the sun alone produce a tide of 2 feet, which it is said to do; then that of the moon will be 9 feet, from which it follows, that the spring tides will be 11 feet, and the neap tides 7 feet. But such elevations, as far exceed these, happen from the motion of the water against some obstacles, and from the sea violently entering straits or gulfs, where the force is not broken till the water rises higher.

(458.) The preceding phenomena take place in the open sea, where the ocean is extended enough to be subject to these motions. But the particular situations of places, as to shores, capes, bays, &c. disturb in a considerable degree these general rules. We are now to show how these phenomena may be explained, from the principle of universal gravitation.

(459.) If the earth were entirely fluid and quiescent, its particles, by their mutual gravity towards each other, would form the whole mass into the figure of an exact sphere. If a power were exerted on all the particles of this sphere, with an equal force, and in parallel directions, the whole mass would be moved together, but no change could be produced on its spherical figure, and its centre would have the same motion as each particle.

(460.) Upon this hypothesis, if the motion of the earth, round the centre of gravity of the earth and moon, were destroyed, and the earth left to the influence of its gravitation towards the moon, as the power above mentioned, then the earth would fall or move straight towards the moon, without changing its spherical figure.

(461.) But the fact is, that the effects of the moon's action, as well as the action itself on different parts of the earth, are not equal, those parts, by the general rules of gravity, being most attracted that are nearest to the moon, and those being least attracted that are farthest from her, while the parts, that are at a middle distance, are attracted by a mean degree of force; besides, all the parts are not acted upon in parallel lines, but in lines directed towards the centre of the moon, in both which accounts, the spherical figure of the fluid earth must suffer some change from the action of the moon, so that in falling, as we have supposed, the nearer parts being most attracted, would fall quickest, the farther parts being least attracted, would fall slowest, and the fluid mass would be lengthened out, and take a kind of spheroidal form.

(462.) Hence it appears, (which must be carefully observed,) that it is not the action of the moon itself, but the inequalities in that action, that cause any variation from the spherical figure; and that if this action were the same in all the particles, as in the central parts, and operating in the same direction, no such change would ensue.

(463.) Let us now admit the parts of the earth to gravitate toward its centre, then as this gravitation far exceeds the action of the moon, and much more exceeds the differences of her actions

on different parts of the earth, the effect which results from the inequalities of these actions of the moon, will be only a small diminution of the gravity of those parts of the earth, which it endeavoured in the former supposition to separate from its centre; that is, those parts of the earth which are nearest to the moon, and those that are farthest from her, will have their gravity towards the earth somewhat abated, to say nothing of the lateral parts; so that supposing the earth fluid, the columns from the centre, to the nearest, and to the farthest parts must rise, till, by their greater height they be able to balance the other columns, whose gravity is less altered by the inequalities of the moon's action, and thus the figure of the earth must still be an oblong spheroid.

(464.) Let us now consider the earth, instead of falling toward the moon by its gravity, as projected in any direction, so as to move round the centre of gravity of the earth and moon, it is evident, that in this case the several parts of the fluid earth will still preserve their relative position, and the figure of the earth will remain the same as if it fell freely towards the moon; that is, the earth will still assume a spheroidal form, having its longest axis directed toward the moon.

(465.) From the preceding reasoning, it appears, that the parts of the earth directly under the moon, as at H, (Plate XVII. fig. 4.) and also the opposite parts at D, will have the flood or high water at the same time, while the parts at B and F, at 90° distance, or where the moon appears in the horizon, will then have the ebb, or lowest waters. Hence as the earth turns round its axis from the moon to the moon again in 24 h. 48 m. this oval of water must shift with it, and thus there will be two tides of flood, and two of ebb in that time. It farther appears, that by the motion of the earth on her axis, the most elevated part of the water is carried beyond the moon, in the direction of the rotation; so that the water continues to rise after it has passed directly under the moon, though the immediate action of the moon there begins to decrease; and comes not to its greatest elevation, till it has got about half a quadrant farther. It continues to descend after it has passed at 90° from the point below the moon, to a like distance of half a quadrant.

(466.) The greatest elevation, therefore, is not in the line drawn through the centres of the earth and moon, nor the lowest points, where the moon appears in the horizon, but all these are removed about half a quadrant eastward from these points in the direction of the motion of rotation. Thus, in open seas, where the water flows freely, the moon, M, is generally past the north and south meridian, as at p, when the high water is at Z, and at u; the reason of which is plain, because the moon acts with the same force after she has passed the meridian, and thus adds to the libratory or waving motion which the water acquired, when she was in the meridian.

(467.) Besides, the tides answer not always to the distance of the moon from the meridian, at the same places, for the action of the sun brings them on sooner when the moon is in her 1st and 3d quarters, and keeps them back later when she

in her *ed* and *eth*, because, in the former case, the tide, raised by the sun alone, would be earlier, than that raised by the moon, and in the latter case, later.

(463.) We have hitherto adverted only to the action of the moon, in producing the tides; but it is evident, that for the same reasons, the inequality of the sun's action, on different parts of the earth, would produce a like effect, and a like deviation from an exact spherical figure, so that, in reality, there are two tides, every natural day, from the action of the sun, as there are in a lunar day, from the action of the moon, subject to the same laws; and the lunar tide, as has been observed, is somewhat changed by the action of the sun, the change varying every day, on account of the inequality between the natural and lunar day.

(46.) Although the gravitation of the earth, towards the sun, is much greater than its gravitation towards the moon, yet, by reason of the immense distance, to which the sun's diameter bears a small proportion, his action upon the tide of the earth is to him differs but little, from that which is exerted on the tide farthest from him, and it is only the inequalities in that action, which produce the tides. However, the effect of the sun is still very sensible, but that of the moon is much more so, by its proximity to the earth, there is a considerable inequality, both in the direction of its action, and in the intensity of that action upon different parts of the earth.

As that of the sun, the force of the moon is easily to be seen, because the tides must be greatest at new and at full moon, because the actions of the sun and moon are then exerted in the same directions. These are called **spring tides**; whereas, when the sun and moon are 90° distant, the action of the moon is perpendicular to the surface of the water, the other two deflects them, and thus are produced what are called **neap tides**. Newton has calculated the effects of the sun and moon respectively upon the tides from their attractive powers, the former he finds to be, to the force of gravity, as 1 to 100,000. To find the force of the latter upon the sea, he compares the spring tides at the mouth of the river Avon, below Bristol, with the neap tides, and finds the proportion as 9 to 1; whence, after several necessary corrections, he concludes, that the force of the moon, in raising the waters, is as to the moon's distance, as 1 to 133,600.

(c) Dr Horley, however, in his edition of Newton's *Principia*, estimates the force of the moon to that of the sun, as 50669 to 1, and our authors have quite different proportions; but Newton's conclusion, from his proposition, that the moon may raise the waters 9 feet, 24 inch, and the sun and moon together may produce an elevation of about 21 feet, 1 inch, and about 25 feet, when the moon is at her nearest distance. Now this is found by observation, to be nearly the height to which the water rises, on the coasts of the open and deep ocean.

(45.) It may be observed, that the spring tides do not happen precisely at new and full moon, nor the neap tides precisely at the quarters, but a day or two after, because, as in other cases, so in this, the effect is not greatest or least, when the immediate influence of the cause is greatest.

or least, for if the actions of the sun and moon were to cease, yet the tides would continue for some time; as the waves of the sea continue their motion after a storm.

(47.3.) The different distances of the moon from the earth produce a sensible variation in the size of the spring tides, shewing, that they increase as the number of the distance *decrease*, so that the moon at half her distance would produce a tide twice greater. The moon describes an oval, round the earth; and at her nearest distance, produces the tide, sensibly greater than at her farthest distance. Hence two great spring tides never succeed each other, at the distance of 14 days, for, if the moon be at her least distance at the change, will therefore produce a great spring tide, the sun is at her greatest distance at the full, and therefore, the spring tide will be less.

The spring tides are highest, and the neap tides lowest, about the time of the equinoxes; because, were the sun or moon a pole of the world, there would be no tide, if their action would raise the water at the equator, or any parallel, equally round the earth; for the force of gravity is the same, and the greater must be their effect. When the sun and moon traverse the equator, the tides, which under them, will traverse the greatest circle of the waters will be put into the greatest agitation. They will also be the greatest at their conjunction and opposition, from the beginning of March, and end of September, to the summer months.

(475.) As the greatest of the two tides is swelling in every diurnal revolution of the moon, in that in which the moon is nearest the sun, it is therefore, with the sun, the greatest of their figure, the water of the two diurnal tides in our climate, will be that arising from the moon when above the horizon; and when the sun is in the northern sign, the greatest is that arising from the moon below the horizon. Thus, the equinoxes in summer exceed the morning tides, and the winter the evening tides, by 15 inches. This difference is found at Bristol, 15 inches, and at Plymouth 23 inches.

(476.) Such would the tides regularly be, if the earth were covered all over with the sea, to great depth, so that the waters might feel the influence of the sun and moon, and the tides pass over shoals, and run through narrow channels, and into bays, and through various, and their height depends upon a great many circumstances. That the tides may be thus full motion, the ocean, in which they are produced; ought to be at least 90° extent from east to west; because that is the distance between the greatest elevation, and the greatest depression, produced in the waters by the moon.

(477.) Hence it appears, that it is only in the great oceans that such tides as we have described can be produced, and why in the larger Pacific ocean they exceed those in the Atlantic ocean. Hence it is obvious why the tides are not so great in the torrid zone, between Africa and America, where the ocean is narrower, as in the temperate zones on either side; and hence also, why the tides are so small in islands, at great distances

SECT. VI. VI

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om the shores. It likewise appears, that the waters cannot rise on one shore of the Atlantic ocean, but by descending on the other, so that at the intermediate islands, it must remain at a mean height, between its elevations on those two shores.

(478.) The tides, that enter the mouths of rivers from the ocean, are greatly retarded in their progress, by the currents of the rivers. Mr Condamine, while in South America, observed, that the river Amazon, there were 5 high waters, and 4 intermediate low waters at once; and a similar circumstance takes place in the Thames.—For the tide, propagated by the moon in the German ocean, when she is 3 hours past the meridian, takes 12 hours longer to come to London bridge, so that when it is high water there, a new tide is already come to its height in the ocean, and in some intermediate place, it must be low water at the same time.

(479.) At several places, it is high water three hours before the moon comes to her meridian; at that tide, which the moon pushes as it were before her, is only the tide opposite to that which is raised by her, when she was 9 hours past the opposite meridian.

(480.) There are no sensible tides in the Baltic, the Mediterranean, or the Black Seas; for they communicate with the ocean, by such narrow intakes, and are of so immense an extent, that they cannot speedily receive and empty water enough, to raise or depress their surfaces sensibly. In the Caspian Sea, and in lakes, &c. the moon's attraction is nearly the same upon all parts of their surface, so that no sensible swelling can take place in their waters.

(481.) We may also conclude, that by reason of the fluidity of the atmosphere, it must have tides similar to those of the ocean; and hence, there will be a general current from east to west, both of the waters of the ocean, and of the air; but the changes produced in the state of the atmosphere, from chemical causes, will so much affect the general current, as to prevent it from being perceived.

SECT. VI. *Of the HARVEST MOON.*

(482.) It is remarkable, that the moon, during the week in which she is full about the time of harvest, rises sooner after sun-setting, than she does in any other full moon week throughout the year. By this means, she affords an immediate supply of light after sun-set, which is very beneficial for those employed in the harvest, and gathering in the fruits of the earth. Hence this full moon is distinguished from all others in the year, by calling it the HARVEST MOON.

(483.) To conceive the reason of this phenomenon, it may first be considered, that the moon is always opposite to the sun, when she is full, and therefore, in the harvest months, she is full in Pisces and Aries, which are opposite to Virgo and Libra, the signs occupied by the sun about the same season. Now, the signs Pisces and Aries rise in a shorter space of time than others, as is easily shewn and illustrated by a celestial globe; and the same thing may be conceived from this circumstance, that in northern latitudes, the small

left angle, made by the ecliptic and horizon, is when Aries rises, at which time Libra sets; and it is obvious, that the smaller the angle contained by the ecliptic and horizon, the greater portion of the ecliptic will rise by the earth's rotation, in a given time. Consequently, when the moon is full in harvest, she rises with less difference of time, or more immediately after sun-set, than at any other season of the year.

(484.) In our winter, the moon is in Pisces and Aries, about the time of her first quarter, when she rises about noon, and therefore, her rising is not then noticed.

(485.) In spring, the moon is in Pisces and Aries about the time of her change, but as she then gives no light, and rises with the sun, her rising cannot be perceived.

(486.) In summer, the moon is in Pisces and Aries at the time of the last quarter, and then as she does not rise till midnight, her rising usually passes unobserved.

(487.) But in autumn, the moon is in Pisces and Aries, at the time of her full, and rises soon after sun-set, for several evenings successively; which makes her regular risings very conspicuous, at that time of the year.

(488.) All this would happen, even if the moon's orbit lay in the ecliptic; but her orbit makes with the ecliptic an angle of $5^{\circ} 18'$ and crosses it in two points, called her *nodes*; so that her rising when in Pisces and Aries, will sometimes not differ above an hour and 40 minutes, through a whole week; and at other times, in the same two signs she will differ in a week $3\frac{1}{2}$ hours, in the time of her rising, according to the different positions of the nodes, with respect to these signs; which positions are always changing, because the nodes go backward through the ecliptic, in 18 years, 225 days.

(489.) This revolution of the nodes causes the harvest moons to go through a whole course of the most advantageous and least beneficial states, with respect to the harvest, every 19 years. They are least beneficial at present, in 1796, and will be so, in 1797; after which, they will be most beneficial from that period to 1806. In 1807 they again become least beneficial, and continue so till 1815. Their most advantageous period begins again in 1816, and lasts till 1825, when the opposite period commences, and lasts to 1834; and again they are most beneficial from 1835, to 1843, and so on.

SECT. VII. *Of the HORIZONTAL SUN and MOON.*

(490.) Philosophers have been much at a loss to account for the apparent magnitudes of the sun and moon, being greater when they are in the horizon, than when elevated above it. For according to the laws of vision, they should appear least, when nearest the horizon, because they are then farthest from the eye; and yet, it is found, that the contrary is true, in fact. Thus, although the diameter of the moon, when in the horizon, as measured by an instrument, is not found to be greater than when measured at her greatest elevation in the meridian, yet her *apparent* diameter, when in the horizon, seems to the eye, 2 or 3

PART IV.

ASTRONOMICAL OPERATIONS AND CALCULATIONS.

SECT. I. Of DRAWING a MERIDIAN LINE.

(502.) Upon a plain board, set parallel to the horizon, describe a circle ABF , as in Plate XVII, fig. 6. And upon the centre, C , erect a stile or gnomon, exactly perpendicular to it, and so high, that the top of the shadow thereof may fall upon the circumference of the circle about the middle of the forenoon. Mark the point B exactly where the top of the shadow falls in the forenoon; and mark the point F where the top of the shadow falls on the circumference, in the middle of the afternoon. Then through the centre C , draw the line ACD , bisecting the arch BF . Then AD is the meridian required.

(503.) It is proper to draw several concentric circles, and to make observations with them all, that they may confirm one another. If the sun happens to be clouded in one, it may be clear in another. It is best to make these observations about the solstices, when the sun does not alter his declination sensibly; and the summer solstice is to be preferred.

(504.) The sun is evidently highest when in the meridian; and at equal distances therefrom has equal altitudes. Therefore, when the distances DB , DF are equal, the shadows CB , CF will be equal, and therefore the altitudes equal. And the *vice versa*.

(505.) II. Hang up two threads and plummets AB , CD , Plate XXVIII. fig. 12. at a good distance, in vessels of water, to keep them steady; of which CD is moveable towards the left and right, upon a pin C . Wait till the pole star, E , and the star Alloth, F , (in the great bear's rump), come into the same plumb line, AB , to an eye placed at I . At that instant (or rather before) move the thread CD also into the same line; so that the thread CD may hide the thread AB , and the pole star E from the eye at I . Then the plane $ABCD$ is the plane of the meridian; and where it intersects the horizontal plane, is the meridian line. And the same may be done with the star, called Cassiopeia's lip. To take away the star's rays, look through a small hole in a thin plate. This must be performed in a calm place.

(506.) If it is wished to have a meridian drawn in some other place, let the threads and plummets AB , CD , remain; and hang up two others ab , cd , in the place proposed, as in fig. 13, letting ab be moveable upon a pin at a . Then wait till any star, as G , comes into the plane $ABCD$ to the eye, at I ; and at that instant, move the thread ab , till the same star G fall in the plane $abcd$, to the eye at b ; then $abcd$ is the plane of the meridian. This is best done by help of an assistant. This method will in time deviate a little from the truth, occasioned by the stars changing their places; but that change is very inconsiderable for several years.

(507.) III. Having a clock or watch, with minutes and seconds, find the northing of the star, Alloth, F , (fig. 12.) by the astronomical tables; and wait till the pole star E is in a plumb line with F . At that instant, set the clock to the said time of northing. And next day at 12 o'clock, draw a

meridian line, by the shadow of a plumb line hung in the sun. Or find the time of southing of any other star, as G , and the clock remaining as before, when she shews the time of southing, place the threads ab , cd , (Fig. 13.) so that the line Gb may pass through them both. Then $abcd$ will be in the plane of the meridian.

SECT. II. Of FINDING TIME, and the EQUATION of TIME.

(508.) Having drawn a meridian line as directed in last article, the time when the sun, or any other celestial body is exactly in the meridian, may be found by a common quadrant, placing the edge of it along the line, and observing when the sun or other luminary can be seen exactly through its two sights, and noting exactly the time; which, supposing the luminary viewed to be the sun, will be precisely noon, or 12 o'clock: but as the apparent diameter of the sun is pretty large, it ought to be known exactly when his centre is in the meridian, which will be some short space after his eastern limb has arrived at it, and before his western limb comes thither. It will be proper, therefore, to observe exactly the time of the two limbs being seen through the sights of the quadrant; and the half of the difference between these times, added to the one or subtracted from the other, will give the exact time when the sun's centre is in the meridian.

(509.) The same method is equally applicable to the moon; but not to the stars, which have no sensible diameter. It is found, by observation, that the stars appear to go round the earth in 23 hours 56 minutes 4 seconds, and the sun in 24 hours; so that the stars gain 3 minutes 56 seconds upon the sun every day, which amounts to one diurnal revolution in a year; and therefore, in 365 days, as measured by the returns of the sun to the meridian, there are 366 days as measured by the stars returning to it: the former are called SOLAR DAYS, and the latter SIDERIAL.

(510.) If the earth had no annual motion, but only a diurnal, any given meridian would revolve from the sun to the sun again, in the same quantity of time as from any star to the same star again; because the sun would never change his place with respect to the stars. But, as the earth advances almost a degree eastward in its orbit, in the time that it turns eastward round its axis, whatever star passes over the meridian on any day with the sun, will pass over the same meridian on the next day, when the sun is almost a degree short of it; that is, 3 minutes 56 seconds sooner. If the year contained only 360 days, as the ecliptic does 360 degrees, the sun's apparent place, so far as his motion is equable, would change a degree every day; and then the sidereal days would be just 4 minutes shorter than the solar.

(511.) As the motion of the earth round its axis is perfectly uniform and equal at all times of the year, the sidereal days are always precisely of an equal length; and so would the solar or natural days be, if the earth's orbit were a perfect circle, and its axis perpendicular to its orbit. But the earth's diurnal motion on an inclined axis, and its annual motion in an elliptic orbit, cause the sun's apparent motion in the heavens to be unequal: for

for sometimes he revolves from the meridian to the meridian again in somewhat less than 14 hours, shown by a well regulated clock; and at other times in somewhat more. So that the time shown by a good clock and a true sun-dial is never exactly the same, but on the 15th of April, the 16th of June, the 1st of August, and the 14th of December.—The clock, if it goes equably and true all the year round, will be before the sun from the 24th of December till the 15th of April; from that time till the 16th of June, the sun will be before the clock; from the 16th of June till the 1st of August, the clock will be again before the sun; and from thence to the 14th of December, the sun will be faster than the clock.

(312.) The equation of time, therefore, or difference between the time shown by a well regulated clock and a true sun dial, depending upon two causes, viz. the obliquity of the ecliptic, and the unequal motion of the earth in it, the united effects, resulting from their combination, may be explained in the following manner.

(313.) Let $Z\varphi\alpha$ in PLATE XXXIX. fig. 2. be the earth, ZFR , its axis, $abcd$, &c. the equator, $ABDE$, &c. the northern half of the ecliptic from φ to α on the side of the globe next the eye, and $MNOP$, &c. the southern half on the opposite side from α to φ . Let us suppose a fictitious sun to set out from φ , at the same instant with the real sun. Let the points at A, B, C, D, E, F, G , &c. quite round, from φ to φ again, bound equal portions of the ecliptic, gone through in equal times by the real sun; and those at a, b, c, d, e, f, g , &c. equal portions of the equator described in equal times by the fictitious sun, and let $Z\varphi\alpha$ be the meridian.

(314.) As the real sun moves obliquely in the ecliptic, and the fictitious sun directly in the equator, with respect to the meridian $Z\varphi\alpha$, 2 degrees, or any number of degrees, between φ and F on the ecliptic, must be nearer the meridian $Z\varphi\alpha$, than a degree, or any corresponding number of degrees, on the equator from φ to f , and the more so, as they are the more oblique, and therefore the true sun comes sooner to the meridian every day, whilst he is in the quadrant φF , than the fictitious sun does in the quadrant φf , for which reason, the solar noon precedes noon by the clock, until the real sun comes to F , and the fictitious to f ; which two points, being equidistant from the meridian, both suns will come to it precisely at noon by the clock.

(315.) While the real sun describes the second quadrant of the ecliptic $FQHKL$, from Cancer to α , he comes later to the meridian every day, than the fictitious sun moving through the second quadrant of the equator, from f to α , for the points at G, H, I, K , and L , being farther from the meridian, their corresponding points at g, h, i, k , and l , must be later of coming to it, and as both suns come at the same moment to the point α , they come to the meridian at the moment of noon by the clock.

(316.) In departing from Libra, through the 3d quadrant, the real sun going through $MNOQ$ towards φ at R , and the fictitious sun through $mnoq$ towards r , the former comes to the meridian every day sooner than the latter, until the

real sun comes to φ , and the fictitious to r , and then they come both to the meridian at the same time. Lastly, as the real sun moves equably through $STUVW$, from φ towards φ ; and the fictitious sun through $stuvw$, from r towards r , the former comes later every day to the meridian than the latter, until they both arrive at the point φ , and then they make it noon at the same time with the clock.

(317.) We now proceed to explain the cause of this difference, viz. the inequality of the sun's apparent motion, which is slowest in summer, when the sun is farthest from the earth, and swiftest in winter when he is nearest to it.

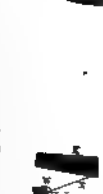
(318.) As the real sun moves unequably in the ecliptic, let us suppose a fictitious sun to move equably in a circle coincident with the place of the ecliptic. Let $ABCD$ in PLATE XXXIX. fig. 3. be the ecliptic or orbit in which the real sun moves, and the dotted circle $abcd$ the imaginary orbit of the fictitious sun: each going round in a year according to the order of letters, or from west to east. Let HKL be the earth turning round its axis the same way every 24 hours, and let φ be both suns to start from A and a , in a right line with the plane of the meridian EH , at the same moment: the real sun at A , being then 2 1/2 greatest distance from the earth, at which time its motion is slowest, and the fictitious sun at a , whose motion is always equable, because its distance from the earth is supposed to be always the same. In the time that the meridian moves from H to H again, according to the order of the letters HKL , the real sun has moved from A to F ; and the fictitious with a quicker motion from a to f , through a large arc: therefore, the meridian EH will revolve sooner from H to a and the real sun at F , than from H to A and the fictitious sun at f ; and consequently it will be late noon by the sun-dial sooner than by the clock.

(319.) As the real sun moves from A toward C , the swiftness of his motion increases all the way to C , where it is at the quickest. But now's standing this, the fictitious sun goes so much upon the real, soon after his departing from A , that the increasing velocity of the real sun does not bring him up with the equally moving fictitious sun, till the former comes to C , and the latter to c , when each has gone half round its ecliptic orbit; and then being in conjunction, the meridian EH , revolving to Eh , comes to both suns at the same time, and therefore it is noon by them both at the same moment.

(320.) But the increased velocity of the real sun, now being at the quickest, carries him before the fictitious one, and therefore, the same meridian will come to the fictitious sun sooner than the real: for whilst the fictitious sun moves from c to C , the real sun moves through a greater arc from C to G ; consequently the point K has as soon by the clock when it comes to c , but not so soon by the sun till it comes to C . And although the velocity of the real sun diminishes all the way from C to A , and the fictitious sun by an equal motion is still coming nearer to the real sun, yet they are not in conjunction till the real sun comes to A and the other to a , and then it is noon by them both at the same moment.



Fig. 6



ASTRONOMY.

Plate XXX.

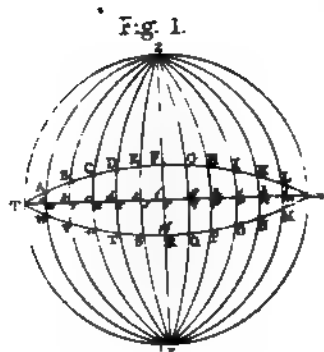


Fig. 1.

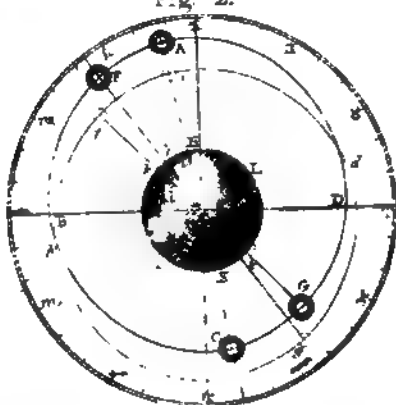


Fig. 2.

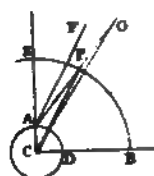


Fig. 3.

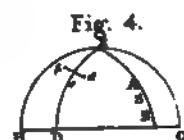


Fig. 4.

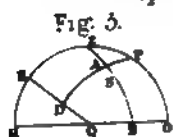


Fig. 5.

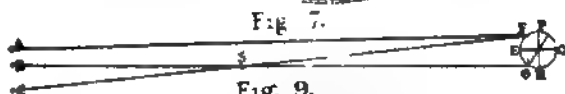


Fig. 7.

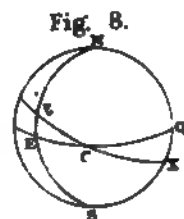


Fig. 8.

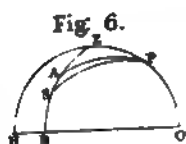


Fig. 6.

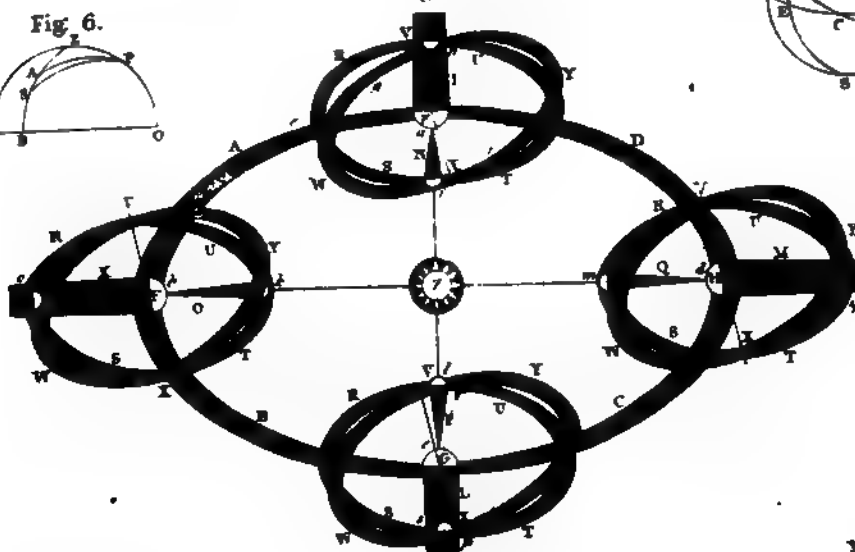


Fig. 9.

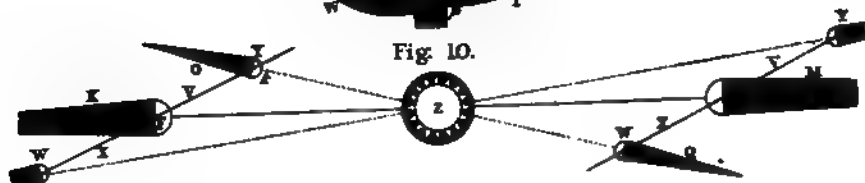


Fig. 10.

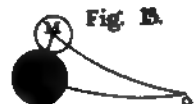


Fig. 11.

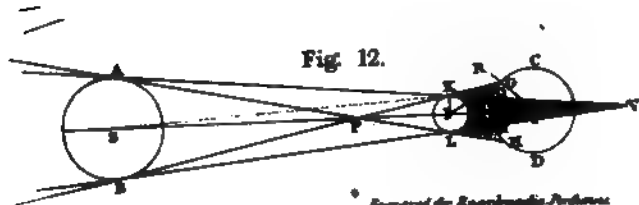


Fig. 12.

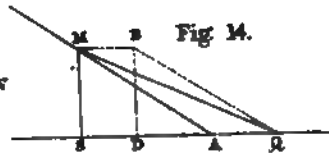
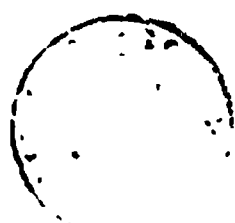


Fig. 14.

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(521.) Thus it appears, that the solar noon is always later than noon by the clock, whilst the sun goes from C to A; sooner, whilst he goes from A to C; and at these two points the sun and clock being equal, it is noon by them both at the same moment. Upon these principles tables for the equation of time are calculated, the one giving the difference between the sun's true and mean motion; the other the difference between the sun's longitude and right ascension; from which the arcs are calculated by addition or subtraction. But the calculation cannot, from the precession of the equinoxes, be depended upon for a considerable length of time.

SECT. III. Of CALCULATING the DISTANCES, MAGNITUDES, &c. of the CELESTIAL BODIES.

(522.) These are obtained by finding out the horizontal parallax of the body whose distance is desired to be known; that is, the angle under which the semidiameter of the earth would appear provided we could see it from that body. In general the parallax of a planet is the difference between the real and apparent place of a planet; that is, between its place seen from some part of the surface, and from the centre of the earth: so that the parallax is the angle under which the semidiameter of the earth, terminated by the place of an observer, is seen at the planet; and to find this parallax many methods have been devised.

(523.) I. Let AD, PLATE XXIX. fig. 3. be the earth, C its centre, P the planet; and let the planet's distance CP from the centre of the earth be given. Then ZAP is the complement of the apparent altitude, ZCP the complement of the true altitude. As the planet's distance from the centre of the earth CP: to the earth's radius AC:: is the cosine of the apparent altitude, S.ZAP: to the sine of the parallax. For draw AF parallel to CP. The angle FAP is equal to the angle APC. But ZAF is equal to ZCP, the true zenith distance, and ZAP is the apparent zenith distance; and their difference FAP, or its equal APC is the parallax. But in the triangle CAP, it is CP: S.CAP or ZAP:: CA: S.CPA, or PAF; the parallax.

(524.) II. If the distances of two planets or stars, having the same apparent altitude, be known, and the parallax of one of them.—Let P and G be the planets in the line APC; then APC is the parallax of P, and AGC the parallax of G. Therefore in the triangle CPG, we have CP, CG, and an angle opposite, suppose G, to find the other opposite angle. Therefore distance CP: distance CG:: S.CGP: S.CPG or CPA; that is, the sines of the parallaxes are reciprocally as the distances from the earth's centre.

(525.) III. Let S be the star or planet, whose parallax is sought. See PLATE XXIX. fig. 4. Observe it when it is in the same vertical circle with any two fixed stars, A, B. Observe again when the same two stars come into a position parallel to the horizon at a and b ; and let the planet be come to s . Then with an instrument measure the altitude of a or b , and likewise the altitude of s ; and the difference of these altitudes is the parallax. For the real place of the star S is somewhere in

the line AB, and therefore it is also somewhere in the line ab , and therefore its altitude is the same as that of a or b . Therefore the parallax is the difference of the altitudes of a and s , or of b and s .

(526.) IV. Let S be the star or planet; observe its distance from any fixed star B, which is in the same vertical circle ZSB; and measure the distance SB with an instrument. Then observe again when the same two stars have equal altitudes above the horizon, at b and s , and then take the distance bs . This distance will be very near the true distance of the stars B and S; therefore the first distance BS subtracted from the latter distance bs , when B is below S, gives the parallax; or the latter distance subtracted from the former, when B is above S, gives the parallax.

(527.) V. The parallax may be found by observing the azimuth and altitude of the star or planet. Let HZO, PLATE XXIX. fig. 5. be the meridian, EQ the equinoctial, HO the horizon, Z the zenith, P the pole, S the star, ZSB a vertical circle passing through it. Observe the altitude BS, and the azimuth BO, and mark the moment of time when these observations are made; then observe the moment of time that the star comes to the meridian, and then you have the distance of time from the observations. Convert this into degrees, allowing only 23 hours 56 minutes to 360 degrees (which is the time of the earth's rotation to the same star), and you have the arch ED or angle EPA, supposing PAD an hour circle. Therefore in the spherical triangle ZPA, we have the angle ZPA, and angle PZA equal to BO, and the side ZP the co-latitude, to find the side ZA the complement of the altitude; this subtracted from ZS, known by observation, the remainder AS is the parallax.

(528.) VI. Another method is performed by a telescope, with cross hairs in the focus. Direct the telescope to the planet, and turn it round till its motion is along one of the cross hairs, which represents part of the planet's parallel circle; and the other hair perpendicular to it, will represent its hour circle. Observe the time when the planet comes to this hour circle, there fix the telescope, and then take its altitude; then observe the time when some fixed star, whose right ascension is known, comes to the same hour circle. The difference of time between the planet and star coming to this hour circle, turned into degrees (allowing 360 degrees to 23 hours, 56 minutes), gives the difference of right ascensions of the planet and star; and so the apparent right ascension of the planet is known.

(529.) When the planet comes to the meridian, observe it with the telescope, and note the time; and when the star comes to the meridian, note the time of that: then the difference of the times reduced to degrees as before, gives the true difference of right ascensions, so the true right ascension of the planet will be known. Therefore let HO, PLATE XXIX. fig. 6. be the horizon, HZO the meridian, Z the zenith, P the pole, A the true place of the planet, S its apparent place, ZSB a vertical circle; then in the triangle ZPS, we have ZP, ZS, and angle ZPS to find the angle PZS. In the triangle ZPA, we have ZP, angles

#12 angles ZFA, PZA, to find ZA, which taken from ZS, gives Aδ the parallax.

(530.) If the planet have a proper motion of its own, its true place will be always changing, and therefore the change of place must be computed for the time of the observations. This is done by observing its place when in the meridian, twice, and thence the change of place is had for 24 hours; and therefore the place at the times of observations will be had by proportioning the motion according to the times. Here the angle ZPS should be about 90°, to have APS the greatest possible.

(531.) VII. The operation represented in Plate XXIX. fig. 7. requires two observers in different places of the earth, and can be applied to none of the planets but MARS in opposition to the Sun, or to VENUS on the Sun's disk. It is best performed when the Sun is about the equinox. Let PERQ be the earth, PK its axis, EQ the equinoctial, S the planet Mars in opposition to the Sun, and if near the perihelion, it is better. Let two places, F, G, be taken, the one in N. lat. the other in S. lat. the further from the equinoctial the better, and nearly in the same meridian, or rather to places, that the line FG, drawn from the one to the other, may be nearly perpendicular to the orbit of Mars. By this there is a greater ease to work upon. Then let the two observers fetch upon some fixed star as A, which Mars comes very near at that time, and the nearer the better. Having two good instruments perfectly adjusted with micrometers, and being assisted at F and G, let them observe for several nights successively about midnight, the places of Mars at B and C, as he passes by the star A; and take the distances AB and AC every night, during his transit by the star. These observations are to be continued till the distances begin to increase, and no longer, for then he is past the star.

(532.) From these observations, the nearest distance of Mars from the star A may be found, as observed from the places F and G; at least they may be found by interpolation. Let these nearest distances be AB and AC, then we have the difference BC, or the angle BSC or FSC. And from the situation of the places F and G, the length and position of FG will be known, and by these, FS may be found. And lastly, the angle which the radius of the earth subtends at the distance FS, or the horizontal parallax of Mars will be known. If, instead of Mars in opposition, VENUS be observed on the body of the Sun, then her nearest distances from either limb of the Sun must be taken, whose difference will give the angle at Venus, subtended by FG, the rest as before. Thus the parallax of Venus will be obtained. The parallax of Mars, when nearest the earth, has been found 23", 27", and 30" at different times.

(533.) A STAR OF PLANET appears LOWER than it really is, by the QUANTITY of the PARALLAX, which is greater the lower the star is, and therefore the HORIZONTAL PARALLAX is the greatest. The parallaxes of two planets are as the sines of the apparent altitudes directly, and their distances from the earth's centre reciprocally. For when the distance is given, the parallax is as the sine of the zenith distance, (by method 1.) and if the apparent altitude be given, the parallax is

reciprocally as the distance, by method 2, and therefore is in a compound ratio, when neither is given. Here the parallax being very small, we may take the parallax itself for the sine of the parallax.

(534.) THE PARALLAX of a PLANET being known, its DISTANCE may be found. For this only working backward, saying, As sine of the parallax, to the earth's radius, so S. zenith distance, to the planet's distance.

(535.) Having the parallax of any of the planets, the distances of ALL the planets from the sun may be known, in diameters of the earth, or any sort of measure. For the distances of the planets from the sun and from one another, are known in some assumed measure; and by the parallax of a planet, the true distance of it from the sun is known, and therefore all the same distances will be known by proportion.

(536.) THE 7th of these methods has been applied in determining the parallax of Venus, in observations made at different parts of the earth upon what is called her TRANSIT over the sun's disk, a phenomenon, that rarely happens, and when it does happen, it affords the best, and decided the only accurate method of determining that most important problem in astronomy, the SUN'S PARALLAX, or the angle under which the earth's semidiameter appears from the sun.

(537.) The first transit, or passage of Venus over the sun's disk, that ever was observed, happened in 1639, but perhaps the only notable one it was Mr HORROCKS and his friend Mr. PEELE. Two transits have happened since the first in 1761, and the last in 1769. There is no more before 1843, and the next to that will open in 1996. The two late transits were carefully observed. From the first of these Mr. H. computed the sun's parallax to be 8" 49, and from the last, the best astronomers have concluded it to be 8" 6. This is an observation of the first consequence, because it is only by a knowledge of the sun's distance from the earth, it was possible to measure, that we can acquire a knowledge of the true dimensions of the solar system.

(538.) As to the FIRST STEP, no method of ascertaining their distance has hitherto been found out. Those who have formed conjectures concerning them, have thought that they were at least 400,000 times farther from us, than we are from the sun.

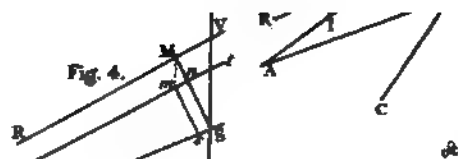
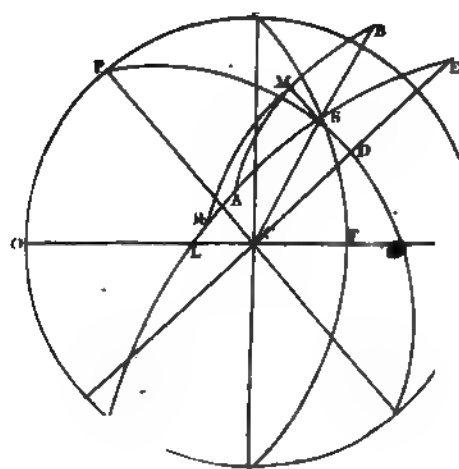
(539.) Dr HERSCHTEL has proposed a method of ascertaining the PARALLAX of the stars, by something similar, but more complete, than the method mentioned by GALILEO and others for finding the parallax of the fixed stars that we shall be able to determine their distance.

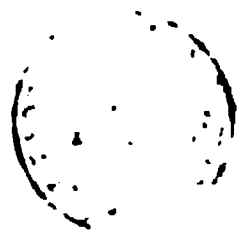
The method pointed out by Galileo, and followed by Hooker, Flamsteed, Mollayre, and others, in taking the distances of stars from the nearest star passing very near it, has given us a much nearer idea of the immense distance of the stars, and opened us with an approximation to the knowledge of their parallax, that is much nearer the truth than we ever had before.

(540.) But HIERICHEL mentions the discovery of their instruments, which were found to be present zenith sectors, the method of using them



isphere with the Figures of the c.







ances being liable to considerable errors on account of refraction, the change of position of the earth's axis arising from nutation, precession of the equinoxes, and other causes, and the aberration of light. The method of his own is by means of double stars; which is exempted from these errors, and of such a nature that the annual parallax, even if it should not exceed the tenth part of a second, may still become more visible, and be ascertained, at least to a much greater degree of approximation than it has ever been done.

(541.) This method is capable of every improvement which the telescope and mechanism of micrometers can furnish; but as it goes on presumptions which can hardly lead to any firm conclusion, we are not likely to gain any farther knowledge, than that the stars are at too great distance to be subjected as yet to our calculations. He supposes that the stars are, one with another, about the size of the sun; and that the difference of their apparent magnitudes is owing to their apparent distances; both of which suppositions being only hypothetical, it is evident that the conclusions founded on them cannot be depended on with absolute certainty.

SECT. IV. Of the DIVISIONS of the STARRY HEAVENS.

(542.) The STARS, from their apparently various magnitudes, have been distributed into several classes, or orders. Those which appear largest, are called STARS of the FIRST MAGNITUDE; the next to them in lustre, STARS of the SECOND MAGNITUDE; and so on to the SIXTH, which are the smallest that are visible to the bare eye. This distribution having been made long before the invention of telescopes, the stars which cannot be seen without the assistance of these instruments, are distinguished by the name of TELESCOPIC STARS.

(543.) The ancients divided the starry heavens into particular CONSTELLATIONS, or clusters of stars, according as they lay near one another, as to occupy those spaces, which the figures of different sorts of animals or things would take up, if they were there delineated. And those stars, which could not be brought into any particular constellation, were called *unformed stars*.

(544.) By this division, the stars are so distinguished from one another, that any particular star may be readily found in the heavens, by means of a celestial globe; on which the constellations are so delineated, that the most remarkable stars are placed in such parts of the figures, as are most easily distinguished. See Plates XXX. and XXXI. fig. 1. of each.

(545.) The number of the ancient constellations is 48, and upon our present globes about 70. On Senex's globes are inserted Bayer's letters; the first in the Greek alphabet being put to the biggest star in each constellation, the second to the next, and so on; by which means every star is as easily found as if a name were given to it. Thus, if the star γ in the constellation of the ram be mentioned, every astronomer knows as well what star is meant, as if it were pointed out to him in the heavens.

(546.) The starry heavens are also divided into three parts: viz. I. The ZODIAC, which extends quite round the heavens; is about 16 degrees broad, so that it takes in the orbits of all the planets, as well as that of the moon; and along the middle of which is the *ecliptic*. II. All that region of the heavens which is on the NORTH side of the zodiac, containing 21 constellations: And, III. That on the SOUTH side, containing 15.

(547.) The following TABLES exhibit the names of the ancient and modern constellations, and the number of stars observed in each of them by different astronomers.

(548.) TABLE I. THE ANCIENT CONSTELLATIONS.

| | | NUMBER of STARS in EACH, according to | | | |
|----------------------------|-----------------------|---------------------------------------|----------|------------|---------|
| NAMES. | ENGLISH NAMES. | PTOLEMY. | T.BRAHE. | HEVELIUS. | FLAMST. |
| Ursa minor | The Little Bear | 8 | 7 | 12 | 24 |
| Ursa major | The Great Bear | 35 | 29 | 73 | 87 |
| Draco | The Dragon | 31 | 32 | 40 | 80 |
| Cepheus | Cepheus | 13 | 4 | 51 | 35 |
| Bootes, or Arctophilax | — — — | 23 | 18 | 52 | 54 |
| Corona Borealis | The Northern Crown | 8 | 8 | 8 | 21 |
| Hercules, or Engonasin | Hercules kneeling | 29 | 28 | 45 | 113 |
| Lyra | The Harp | 10 | 11 | 17 | 21 |
| Cygnus, or Gallina | The Swan | 10 | 18 | 47 | 81 |
| Cassiopeia, | The Lady in her Chair | 13 | 26 | 37 | 55 |
| Perseus | Perseus | 29 | 29 | 46 | 59 |
| Auriga | The Waggoner | 14 | 9 | 40 | 66 |
| Serpentarius, or Ophiuchus | Serpentarius | 29 | 15 | 40 | 74 |
| Serpens | The Serpent | 18 | 13 | 22 | 64 |
| Sagitta | The Arrow | 5 | 5 | 5 | 18 |
| Aquila, or Vultur | The Eagle | 15 | 12 | 23 | 71 |
| Antinous | Antinous | | 3 | 19 | |
| Delphinus | The Dolphin | 10 | 10 | 14 | 18 |
| Equulus, or Equi sectio | The Horse's Head | 4 | 4 | 6 | 10 |
| Pegasus, or Equus | The Flying Horse | 20 | 19 | 38 | 89 |
| Andromeda | Andromeda | 23 | 23 | 47 | 66 |
| VOL. II. PART II. | | X x x x | | Triangulum | |

(552.) It has been already observed, that the foundation of all astronomical operations is the drawing a meridian line. This being done, the next thing is, to find out the latitude of the place where the observations are to be made, and for which the meridian line is drawn. Now, the latitude of a place is equal to the elevation either of the north or south pole above the horizon; but as there is no star exactly in either of the celestial poles, to find the altitude of that invisible point, called the *POLE of the heavens*, we must choose some star near it, which does not set; and, having found its greatest and least altitudes, divide their difference by 2; and half that difference, added to the least, or subtracted from the greatest, altitude of the star, gives the exact altitude of the pole, or latitude of the place. Thus, suppose the greatest altitude of the star observed is 60° , and its least 50° , we then know, that the latitude of the place, where the observation was made, is exactly 55° .

(553.) Having found the latitude, the *OBLIQUITY of the ECLIP TIC*, or the angle made by the sun's annual path, with the earth's equator, is easily obtained by the following method. Observe, about the summer solstice, the sun's meridian distance from the zenith, which is easily done by a quadrant, with a moveable index, furnished with sights; if this distance is subtracted from the latitude of the place, provided the sun is nearer the equator than the place of observation, the remainder will be the obliquity of the ecliptic: but, if the place of observation is nearer the equator than the sun at that time, the zenith distance must be added. By this method, the obliquity of the ecliptic hath been determined to be $23^{\circ} 29'$.

(554.) Here it is proper to observe, that, the obliquity of the ecliptic to the equinoctial, is found, at present, to be above the third part of a degree less than Ptolemy found it. And most of the observers after him, found it to decrease gradually, down to Tycho Brahe's time. If it be objected, that we cannot depend on the observations of the ancients, because of the incorrectness of their instruments, we have to answer, that both Brahe and Flamsteed are allowed to have been very good observers; and yet we find, that Flamsteed makes this obliquity $2\frac{1}{2}$ minutes of a degree less than Brahe did, about 100 years before him; and as Ptolemy was 1324 years before Tycho Brahe, so the gradual decrease answers nearly to the difference of time between these three astronomers. If we consider, that the earth is not a perfect sphere, but an oblate spheroid, having its axis shorter than its equatorial diameter; and that the sun and moon are constantly acting obliquely, upon the greater quantity of matter, about the equator, pulling it, as it were, towards a nearer and nearer coincidence with the ecliptic; it will not appear improbable, that these actions should gradually diminish the angle between those planes. Nor is it less probable, that the mutual attractions of all the planets, should have a tendency to bring their orbits to a coincidence: but this change is too small to become observable in many ages.

(555.) The *DECLINATION* of the sun from the

equator, for any day, may be found, by the same method by which we find the obliquity of the ecliptic: and thus, a table of his declination for every day in the year, might be constructed: Thus, also, the declination of the stars might be found. Having found the declination of the sun, his right ascension, and place in the ecliptic, may be geometrically found, by the solution of a case, in spherical trigonometry. For let EQ, in Plate XXIX. fig. 8. represent the celestial equator, γ the sun, and γX the ecliptic; then, in the right angled spherical triangle EC γ , we have the side E γ , equal to the sun's declination: the angle EC γ is always $23^{\circ} 29'$, being the angle of the ecliptic with the equator; and the angle γEC is 90° , or a right angle. From these data, we can find the side EC, the right ascension; and C γ , the sun's place in the ecliptic, or his distance from the equinoctial point; and thus, a table of the sun's place, for every day in the year, answerable to his declination, may be formed.

(556.) The *RIGHT ASCENSION* of the stars may be found by the sun's place in the ecliptic, and a good pendulum clock: for which purpose, the motion of the clock must be so adjusted, that the hand may run through the 24 hours, in the time that a star, leaving the meridian, will arrive at it again; which time is somewhat shorter than the natural day, because of the space the sun moves through in the mean time eastward. The clock being thus adjusted, when the sun is in the meridian, fix the hand to the point, from whence we are to begin to reckon our time; and then observe when the star comes to the meridian, and mark the hour and minute that the hand then shews: The hours and minutes described by the index, turned into degrees and minutes of the equator, will give the difference between the right ascension of the sun and stars; which difference, being added to the right ascension of the sun, will give the right ascension of the star.

(557.) If we know the right ascension of any one star, we may from it, find the right ascensions of ALL the others which we see, by marking the time upon the clock, between the arrival of a star, whose right ascension we know to the meridian, and another star, whose ascension is to be found. This time, converted into hours and minutes of the equator, will give the difference of right ascensions; from whence, by addition, we collect the right ascension of the star which was to be found out.

(558.) When the right ascension and declination of a star is found, its longitude and latitude, or distance from the first star of Aries, and north or south from the ecliptic, may thence be easily found; and the places of the fixed stars being all marked in a catalogue, according to their longitudes and latitudes, it may thence be conceived, how the longitude and latitude of a planet or comet may be found for any particular time, by comparing its distance from them, and its apparent path may thus be traced; and thus, the paths of Mercury and Venus were traced by M. Callini.

(559.) To find out the *PERIODICAL TIMES* of the PLANETS, we must observe when they have no latitude. At that time the planet is in the ecliptic, and consequently, in one of its nodes;

so that, by waiting till it returns to the same node again, and keeping an exact account of the time, the periodical time of its revolution round the sun, may be known pretty exactly. By similar observations, from the theory of the earth's motion, we can find the position of the line of the nodes; and when once the position of this line is found, the angle of inclination of the planet's orbit to the earth may also be known.

(560.) The **EXCENTRICITY** of the **EARTH'S ORBIT** may be determined, by observing the apparent diameters of the sun at different times; when the sun's diameter is least, the earth is at the greatest distance; and, when this diameter is greatest, the earth is at its least distance from him. But, as this method must necessarily be precarious, another is recommended by Keil, by observing the velocity of the earth in its orbit, or the apparent velocity of the sun, which is demonstrated to be always reciprocally as the square of the distance.

(561.) The excentricities of the orbits of the other planets may be likewise found, by observing their velocities at different times; for all of them observe the same proportions, with regard to the increase or decrease of their velocity, that the earth does; only, in this case, care must be taken, to observe the *real*, not the *apparent*, velocities of the planets, the last depending on the motion of the earth at the same time. Their aphelia, or points of their orbits, where they are farthest from the sun, may be known, by making several observations of their distances from him, and thus perceiving, when these distances cease to increase.

(562.) The position of the aphelion being determined, the planet's distance from it, at any time, may also be found by observation, which is called its *true*, or *requated* anomaly; but, by supposing the motion of the planet to be regular and uniform, tables of that motion may easily be constructed. From thence, the planet's mean place in its orbit, may be found for any moment of time; and one of these moments being fixed upon, as an epocha or beginning of the table, it is easy to understand, that from thence, tables of the planet's place in its orbit, for any number of years, either preceding, or consequent to that period, may be constructed.

(563.) **ASTRONOMICAL TABLES** are to be constructed, according to the meridian of equal time, and not true or apparent time, because of the inequalities of the earth's motion, as well as that of the planet, and equations must be made; to be added to, or subtracted from, the mean motion of the planet, as occasion requires; which will be readily understood, from what we have already mentioned, concerning the unequal motion of the earth, in its orbit. When all the necessary tables are constructed, by this or similar methods, the calculating of the planetary places becomes a mere mechanical operation, and consists only in the additions and subtractions, according to the directions given along with such tables. But it must be observed, that the accidental interference of the planets with one another, by their mutual attractions, renders it impossible to construct any tables, that shall remain equally perfect: and therefore, frequent actual observations and cor-

rections of the tables will be necessary. The disturbance, however, is inconsiderable, except in Jupiter and Saturn, and they are in conjunction only at a distant period.

(564.) The above rules, with regard to the planets, are also applicable to the moon; but with more difficulty, on account of the greater inequalities of her motions. From these irregularities it may well be concluded, that the calculation of the moon's place in her orbit, is a very difficult matter; and indeed, before **NEWTON**, astronomers in vain laboured to subject the lunar irregularities to any rule. By his labours, however, and those of other astronomers, these difficulties are in a great measure overcome; and calculations with regard to this luminary, may be made, with as great certainty, as concerning any other. The periodical time may be determined from the observation of two lunar eclipses, at as great a distance from one another as possible: for, in the middle of every lunar eclipse, the moon is exactly in opposition to the sun.

(565.) Compute the time between these two eclipses or oppositions, and divide this by the number of lunations that have intervened, and the quotient will be the synodical month, or time the moon takes to pass from one conjunction to another, or from one opposition to another. Compute the sun's mean motion in the time of the synodical month, and add this to the entire circle described by the moon. Then, as that sum is to 360°, so is the quantity of the synodical month to the periodical, or time that the moon takes to move from one point of her orbit to the same point again.

(566.) Thus **COPERNICUS** in the year 1500, November 6th, at 2 hours 20 minutes, observed an eclipse of the moon at Rome; and August 15, 1523, at 4 hours 25 minutes, another at Cracow: hence the quantity of the synodical month is thus determined:

| | Y. | D. | H. | M. |
|---|------|-----|----|------------------|
| Observ. 2d | 1523 | 237 | 4 | 25 |
| Observ. 1st | 1500 | 310 | 2 | 20 |
| Interval of time | 22 | 292 | 2 | 5 |
| Add the intercalary days for leap years | | 5 | | |
| Exact interval | 22 | 297 | 2 | 5, or 11,991,100 |

This interval divided by 282, the number of months elapsed in that time, gives 29 days 12 hours 41 minutes for the length of the synodical month. But from the observations of two other eclipses, the same author more accurately determined the quantity of the synodical month to be 29 degrees 11 hours 45 minutes 3 seconds; from whence the mean periodical time of the moon comes to 27 days 7 hours 43 minutes 4 seconds which exactly agrees with the observations of later astronomers.

(567.) When the quantity of the periodical month is found, we may find the moon's diurnal and horary motion; and thus may tables of the moon's mean motion be constructed: and if from

the moon's mean diurnal motion that of the sun be subtracted, the remainder will be the moon's mean diurnal motion from the sun.

(568.) Having found the moon's distance from the sun, her phasis for that time may be easily delineated by the following method laid down by Keil: Let the circle COBP, PLATE XXVIII, fig. 1, & 2. represent the disk of the moon, which is turned towards the earth; and let OP be cut by the diameter BC at right angles; and making LP the radius, take LF equal to the cosine of the elongation of the moon from the sun: and then upon BC, as the great axis, and LF the lesser axis, describe the semi-ellipse BFC. This ellipse will cut off from the disk of the moon the portion BFCP of the illuminated face, which is visible to us from the earth.

(569.) As the moon in the middle of a total eclipse, is exactly in the node, if the sun's place be found for that time, and six signs added to it, the sun will give the place of the node, provided the eclipse be lunar; but if solar, the place of the node and of the sun are the same. From comparing two eclipses together, the mean motion of the nodes will thus be found. The apogee of the moon may be known from her apparent diameter, and by comparing her place when in the apogee at different times, the motion of the apogee itself may also be determined.

SECT. VI. PRELIMINARY OBSERVATIONS respecting ECLIPSES.

(570.) Before we lay down rules for calculating eclipses it is necessary, to make a few general observations respecting their nature and causes. All the planets and satellites being illuminated by the sun, cast their shadow towards that point of the heavens which is opposite to the sun. This shadow is nothing but a privation of light, in the space hid from the sun by the opaque body that intercepts his rays. When the sun's light is intercepted by the moon, so that he appears covered in whole, or in part, to any place of the earth, he is said to *undergo an ECLIPSE*; though, properly speaking, it is only an eclipse of that part of the earth where the moon's shadow or penumbra falls. When the earth comes between the sun and moon, the moon falls into the earth's shadow; and having no light of her own, she suffers a real and total eclipse from the interception of the sun's rays. When the sun is eclipsed to us, the moon's inhabitants, on the side next the earth, see her shadow like a dark spot travelling over the earth, about twice as fast as its equatorial parts move, and the same way as they move. When the moon is in an eclipse, the sun appears eclipsed to her inhabitants; totally to all those parts on which the earth's shadow falls, and of as long continuance as they are in the shadow.

(571.) Although all opaque bodies, on which the sun shines, have their shadows, yet such are the distances of the planets, and the size of the sun, that the primary planets can never eclipse one another. A primary can eclipse only its secondary, or be eclipsed by it; and never but when in opposition or conjunction with the sun. The primary planets are very seldom in these positions, but the sun and moon are so every month:

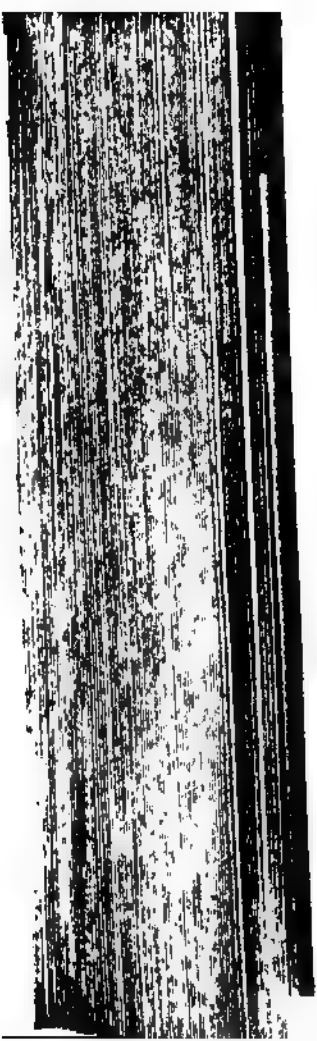
whence one may imagine, that these two luminaries should be eclipsed every month. But there are few eclipses in respect of the number of new and full moons; the reason of which we shall now explain.

(572.) If the moon's orbit were coincident with the plane of the ecliptic, in which the earth always moves and the sun appears to move, the moon's shadow would fall upon the earth at every change, and eclipse the sun to some parts of the earth. In like manner, the moon would go through the middle of the earth's shadow, and be eclipsed at every full; but with this difference, that she would be totally darkened for above an hour and an half; whereas the sun never was above four minutes totally eclipsed to us by the interposition of the moon. But one half of the moon's orbit is elevated $5\frac{1}{2}$ degrees above the ecliptic, and the other half as much depressed below it; and when the sun and moon are more than 17 degrees from either of the nodes at the time of conjunction, the moon is then generally too high or too low in her orbit to cast any part of her shadow upon the earth: when the sun is more than 12° from either of the nodes at the time of full moon, the moon is generally too high or too low in her orbit to go through any part of the earth's shadow; and in both these cases there will be no eclipse.

(573.) But when the moon is less than 17° from either node at the time of conjunction, her shadow or penumbra falls more or less upon the earth, as she is more or less within this limit. And when she is less than 12° from either node at the time of opposition, she goes through a greater or less portion of the earth's shadow, as she is more or less within this limit. Her orbit contains 360° ; of which, 17° , the limit of solar eclipses on either side of the nodes, and 12° , the limit of lunar eclipses, are but small portions: and as the sun commonly passes by the nodes but twice in a year, it is no wonder that we have so many new and full moons without eclipses.

(574.) To illustrate this, let ABCD, PLATE XXIX, fig. 9. be the ecliptic, RSTU a circle lying in the same plane with the ecliptic, and VXYW the moon's orbit, all thrown into an oblique view, which gives them an elliptical shape to the eye. One half of the moon's orbit, as VWX, is always below the ecliptic, and the other half XYV above it. The points V and X, where the moon's orbit intersects the circle RSTU, which lies even with the ecliptic, are the moon's nodes; and a right line XEV, drawn from one to the other, through the earth's centre, is the line of the nodes which is carried almost parallel to itself round the sun in a year. If the moon moved round the earth in the orbit RSTU, which is coincident with the plane of the ecliptic, her shadow would fall upon the earth every time she is in conjunction with the sun, and at every opposition she would go through the earth's shadow; and thus the sun would be eclipsed at every change, and the moon at every full.

(575.) But although the moon's shadow N must fall upon the earth at *a* when the earth is at E, and the moon in conjunction with the sun at *i*, because she is then very near one of her nodes; and



318 ASTRONOMY. PART IV.

at her opposition is for multi go through the earth's shadow I, because she is then near the other node, yet, in the time that she goes round the earth to her next change, according to the order of XYVW, the earth advances from E to e, according to the order of EFGH; and the line of the nodes VEX, being carried nearly parallel to itself, brings the point of the moon's orbit in conjunction with the sun at that next change. The moon being then at f_2 is too high above the ecliptic to cast her shadow on the earth; and as the earth is still moving forward, the moon at her next opposition will be at g_2 too far below the ecliptic to go through any part of the earth's shadow, for by that time the point g will be at a considerable distance from the earth as seen from the sun.

(176.) When the earth comes to F, the moon in conjunction with the sun Z is not at h in a plane coincident with the ecliptic, but above it at Y in the highest part of her orbit; and then the point h of her shadow O goes far above the earth, as in fig. 10, which gives an edge view of fig. 9. The moon, at her next opposition, is not at a , but at W, where the earth's shadow goes far above her, as in fig. 10. In both these cases, the line of the nodes is about 90° from the sun, and both luminaries are as far as possible from the limits of the eclipses. When the earth has gone half round the ecliptic, from E to G, the line of the nodes VGX is nearly, if not exactly, directed towards the sun at Z, and then the new moon h casts her shadow P on the earth G, and the full moon a goes through the earth's shadow L, which brings on eclipses again, as when the earth was at E. When the earth comes to H, the new moon falls not at w in a plane coincident with the ecliptic CD, but at V in her orbit below it; and then her shadow Q (see fig. 10) goes far below the earth. At the next full she is not at f (fig. 9) but at Y in her orbit $5\frac{1}{2}$ degrees above g , and at her greatest height above the ecliptic CD, being then as far as possible, at any opposition, from the earth's shadow M, as in fig. 10.

(177.) Thus when the earth is at E and G, the moon is about her nodes at new and full, and in her greatest north and south declination (or latitude as it is generally called) from the ecliptic at her quarters, but when the earth is at F or H, the moon is in her greatest north and south declination from the ecliptic at new and full, and in the nodes about her quarters. The point X, where the moon's orbit crosses the ecliptic, is called the ascending node, because the moon glides from it above the ecliptic, and the opposite point of intersection V is called the descending node, because the moon descends from it below the ecliptic.

(178.) When the moon is at Y in the highest point of her orbit, she is in her greatest north latitude; and when she is at W in the lowest point of her orbit, she is in her greatest south latitude. If the line of the nodes, like the earth's axis, was carried parallel to itself round the sun, there would be just half a year between the conjunctions of the sun and nodes. But the nodes shift backwards, or contrary to the earth's annual motion, $19\frac{1}{2}$ deg. every year; and therefore the same node comes round the sun 35 days sooner every year than on the year before. Consequently, from the time that the ascending node X (when the earth is at E) passes by the sun as seen from the earth, it is only 175 days (not half a year, till the descending node V passes by him.

(179.) Therefore in whatever time of the year we have eclipses of the luminaries about either node, we may be sure that in 175 days afterward we shall have eclipses about the other node. And when at any time of the year the line of the nodes is in the situation VGX, at the same time next year it will be in the situation rGX; the ascending node having gone backward, that is, contrary to the order of signs, from X to r, and the descending node from V to r, each $19\frac{1}{2}$ deg.

(180.) At this rate, the nodes shift through all the signs and degrees of the ecliptic in 1 year and 252 days, in which time there would have been a regular period of eclipses, if any complete number of lunations were finished without a lunation. But this never happens, for if both the sun and moon should start from a line of conjunction with either of the nodes in any point of the ecliptic, the sun would perform 12 annual revolutions and 22 degrees over and above, and the moon 12 lunations and 85 degrees of the year in the time the node came round to the same point of the ecliptic again, so that the sun would be 22 degrees from the node, and the moon 85 degrees from the sun. But in 22 mean lunations, the sun, moon, and nodes, have been once in a line of conjunction, they return to nearly to the same state again, as that the same node, which was in conjunction with sun and moon at the beginning of the first of these lunations, will be still 22° of a degree of a line of conjunction with the sun and moon again, when the last of these lunations is completed. And therefore in such time there will be a regular period of eclipses, or return of the same eclipses, for many ages.

(181.) In this period, (which was first discovered by the Chaldeans,) there are 18 years and 11 days 7 hours 43 minutes 20 seconds, when the last day of February in leap-years is 102 times included, but when it is five times excluded, the period consists of only 18 years 10 days 3 hours 43 minutes 20 seconds. Consequently, it is the mean time of any eclipse, either of the sun or moon, you add 18 Italian years 11 days 3 hours 43 minutes 20 seconds, when the last day of February in leap-years comes in four times, or 19 years 11 days 3 hours 43 minutes 20 seconds, when it comes in five times, you will have the mean time of the return of the same eclipse, or the falling back of the line of conjunction to the positions of the sun and moon in every period, will add to the line of the nodes in every period, will add it out in periods of time, and after that a full return again in less than 15,000 years.

(182.) These eclipses of the sun, which happen about the ascending node, and begin to appear at the north pole of the earth, will go on continually at each return, till they go round to the earth at the south pole; and there, when kept about the descending node, and begin to appear at the south pole, the earth will go on a little farther at each return, till at last they come back to the earth at the north pole.

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(183.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses.

(184.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (185.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (186.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (187.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (188.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (189.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (190.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (191.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (192.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (193.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (194.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (195.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (196.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (197.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (198.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (199.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses. (200.) In the celestial or the SWAD and the MOON, will happen lunar and solar eclipses.

SECT. VII. Of CALCULATING ECLIPSES.

(583.) The chief things to be considered, in the calculation of eclipses, are, the MAGNITUDES of the SHADOW and PENUMBRA of the opaque body, and the ECLIPTICAL LIMITS, or the distance from the NODE, when an eclipse of the sun or moon will happen. These must be calculated both for lunar and solar eclipses. The operations may be performed as follows.

I. For LUNAR ECLIPSES.

(584.) In Plate XXIX. Fig. 11. Let AB be the sun, and CD the earth. Draw AC, BD, by the edges of the sun and earth, which will meet in a point V, because the sun is bigger than the earth. Draw through the centres of the sun and earth S and E, draw STV. Also draw BCE, ADF, touching the contrary sides of the sun and earth, intersecting in P; also draw SC and CT. If the whole figure be turned round, about the axis SV, the lines AV, BV, APF, BPE, will generate the two cones VLD, EPP; the cone CVD, is the dark shadow of the earth, EPF continued, is the penumbral cone. And beyond V, the section of the cone EPF, will be all in the penumbra.

(585.) Hence, I. *Half the angle of the cone of the earth's shadow CVT*, is equal to the sun's apparent semidiameter, less his horizontal parallax. For in the triangle SCV, the external angle CA = CVS + CST. And CST is the sun's parallax. Therefore CVT = SCA - CST.

(586.) II. Half of the angle of the *earth's penumbral cone CPT*, is equal to the sun's semidiameter and his horizontal parallax. For in the triangle SP, the external angle CPT = PCS + CST.

(587.) III. Hence half the angle of the earth's penumbral cone CPT, is equal to half the angle of the dark cone CVT + twice the sun's horizontal parallax CST.

(588.) IV. The apparent semidiameter of the earth's dark shadow IK, upon the moon's orbit, is equal to the sum of the horizontal parallaxes of the sun and moon, less the sun's apparent semidiameter. For the angle VCI = CIT - CVI = CIT - SCA + CST.

(589.) V. The apparent semidiameter of the earth's penumbra, GI, upon the moon's orbit, is equal to the sum of the horizontal parallaxes of the sun and moon + the sun's apparent semidiameter. For in the triangle PCI, the external angle ECI = CIT + CPT = CIT + PCS + CST.

(590.) VI. Hence to find the LENGTH of the EARTH'S SHADOW. In the triangle CTV there is given the angle V = sun's apparent semidiameter - his parallax, and CT the earth's radius, to find TV.

II. For the SHADOW and PENUMBRA, in SOLAR ECLIPSES.

(591.) In Plate XXIX. Fig. 12. Let AB be the sun, KL the moon, CD the earth. Draw the tangents AK, BL, by the edges of the sun and moon, on the same side, to meet in V; and BKG, MLI to touch the contrary sides. Draw SK, IK; and through S and I the centres of the sun and moon, draw the axis SIV. Then if the whole figure AKVLB be turned about the axis SV,

the sides AV, BV, and PH, PG, will generate two cones KVL, GPH. The cone KVL is the dark shadow of the moon, and the cone GPH is the moon's penumbral cone. Hence,

(592.) I. The angle of the cone of the moon's shadow KLV, the angle of the penumbral cone KPL, the angles GKV, and HLV, are each equal to the sun's apparent diameter AKB, very nearly; and half the angle of either cone P or V is equal to the sun's apparent semidiameter. For by reason of the great distance of the sun from T, in respect of TP, TV, TI; the apparent diameter of the sun, seen from any of the places V, T, I, P, K, will be the same, that is, the angles AVB or KVL, APB or KPL, AKB or GKV, ALB or VLH are all equal; differing only by the angle KSI, which in the moon is insensible.

(593.) II. The height of the cone IP is equal to the cone VI. And KPL, KVL, are equal and similar. For the angles at P and V are equal; and KL is common.

(594.) III. The apparent semidiameter of the moon's dark shadow QO, upon the earth at O, seen from the moon, is equal to the moon's apparent semidiameter - the sun's apparent semidiameter. And if the sun's apparent semidiameter be greater, the shadow does not reach the earth. For draw KO; then in the triangle KOV, VKO = KOS - KVS = KOI - AVS = KOI - $\frac{1}{2}$, the sun's apparent diameter.

(595.) IV. The apparent semidiameter of the moon's penumbra GO, upon the surface of the earth, as seen from the moon, is equal to the sum of the apparent semidiameters of the sun and moon. Draw GI and TGR. Then in the triangle GPI, the external angle GIO = GPI + PGI = KPI + KGI = KPI + KOI = AKS + KOI.

(596.) V. Hence to find the LENGTH IV of the MOON'S SHADOW. In the triangle KVI, there is given the angle KVI = half the sun's apparent diameter, and KI the earth's radius; whence VI will be had; and to find the arch QN of the earth, involved in the moon's dark shadow. In the triangle QVT, we have given TV the difference between the moon's distance from the earth, and the height of the shadow; and the angle QVO = the sun's apparent diameter, and TQ the radius of the earth; to find the angle TQV, to which add QVT, and the sum is the angle QTO or arch QO; and doubled gives the whole arch QN.

(597.) VI. To find the ARCH of the EARTH GH involved in the PENUMBRA; Say, As the earth's radius GT: to S. of the sun's apparent semidiameter: so is PT the sum of the moon's distance and cone's height: to S.TGP or RGK. From this take the sun's apparent semidiameter, and there remains GTO = GO, which doubled gives GH. For in the triangle GPT, there is given the angle P = the sun's apparent semidiameter, and PT the moon's distance and height of the cone, and TG the earth's radius; to find the angle RGK = GPT + PTG. Therefore PTC or OTG = RGK - GPT = RGK - the sun's apparent semidiameter.

III. TO FIND the ECLIPTICAL LIMITS.

(598.) An ECLIPSE of the MOON can only happen, when the distance of the centres of the moon,

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PART IV.

numbra, is less than
era. For if the dif-
ad penumbra cannot

two eclipses, either time; out of the moon, and
another of the sun.

(603.) HALF of the ECLIPSES will, in general,
be INVISIBLE at any given place. And conse-
quently one year with another there can only be
two VISIBLE ECLIPSES in a year, the one lunar,
and the other solar. For the sun and moon spend
as much time below the horizon as above it.

(604.) III. THE ECLIPTICAL LIMITS may be
found for TOTAL ECLIPSES, as well as for PAR-
TIAL ones, by the same method. I. A. by taking
SM = the difference of the semidiameters of the
earth's dark shadow and of the moon, in lunar
eclipses, or = the difference of the semidiameters
of the moon and sun, in solar eclipses.

(605.) IV. ECLIPSES do not happen always
the SAME PLACES of the nodus, but in places
more and more upward. For the eclipses long
about the nodes, and the nodes regress at the
rate of 19 degrees in a year; the places of the
eclipses are 19 degrees more west every
year.

(606.) From these premises, it will be necessary
in calculating a particular eclipse, to consider the
ANGLES that the moon's way makes with the
line at the time of an eclipse. See Plate XXIX. p.
24. Let \odot S be the ecliptic, \odot M the moon's
orbit, \odot the node. And let S be the sun, at
solar eclipse; or the centre of the earth's shadow,
in the lunar; and M the moon at the time of the
eclipse. Take \odot A to \odot S as the sun's hourly
motion, to the moon's, at that time; draw AS
then MAS is the angle required, and AM is
moon's apparent orbit.

(607.) For by construction, in the time that
moon has been moving from \odot to M, she has
through \odot S reckoned in the ecliptic, so as
has moved through a space DS equal to S A.
Therefore the sun was in D, when the moon was
in the node at \odot . Draw DB, MS parallel to
SD; and draw B \odot , which will be parallel to
MA. Now since the moon makes the same
latitude DB or SM, in the same time, whether the
sun moves or stands still. And since SM is her
latitude, when the sun is at S, DB (equal to SM)
will be her latitude, supposing the sun has moved
to D, without any motion towards S, and con-
sequently \odot B will be her apparent way, as
eye at D, through which she seems to move at
the same time. Or, which is the same thing, AS
will be her apparent way to an eye fixed at S.
For the triangles AMS and \odot BD are equal.
MAS is the angle of her way with the ecliptic.
By the theory of relative motions, in bodies
moving the same way, all the apparent motions
are the same, as if one body stood still and the
other moved forward, with the difference of their
motions. And here \odot D or AS is the difference
of their motions, supposing S to be fixed.

(608.) Hence, as the moon's hourly motion
to the fan's hourly motion is 8 \odot the distance
from the node to A \odot . Then AS = 8 \odot - 1
tude SM. tangent angle A.
(609.) It is the apparent orbit AS that must be
made use of, in calculating all the phenomena of
an eclipse. For an observer considered to see
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SECT. V.

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THE RULES

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Vol. II.

ing; and therefore only the relative motions are concerned. To calculate, therefore, an eclipse of the moon, the following rules will be found useful.

V. RULES for CALCULATING LUNAR ECLIPSES.

(610.) I. Find the true time of the opposition, when an eclipse is to happen; and let that be reduced to apparent time.

(611.) II. Find the true places of the sun and moon, when in opposition: 2. The sun's mean anomaly, and the place of his apogee: 3. The place of the moon's ascending node, and of her apogee, and her latitude.

(612.) III. Let $\odot S$, fig. 2. Plate XXX, be a part of the ecliptic; $\odot M$ the moon's orbit; S the centre of the earth's shadow, and M the moon, when in opposition. Take $\odot A$, to $\odot S$ which is known by calculation; as the sun's horary motion, to the moon's; which are known from the astronomical tables. Draw AM , for the way of the moon from the sun. Then in the right angled spherical triangle ASM , there is given $AS = \odot S - \odot A$; and SM the moon's latitude found by calculation; to find the angle SMA .

(613.) IV. Let fall SP perpendicular to AM . Then since the arches SM , MP , SP , are very small, they may be taken for right lines; and the triangle SMP for a plane triangle. Then having SM and angle SMP ; MP and SP will be found. Where P is the place of the moon in the middle of the eclipse. Likewise the time of the moon's moving through MP will be known by her horary motion; and from thence the time when she is at P , or the middle of the eclipse.

(614.) V. From the astronomical tables, find the sun and moon's apparent semidiameters, for the time of opposition; and their horizontal parallaxes.

(615.) VI. From any convenient scale of equal parts, with the centre P and radius PB , equal to the minutes contained in the moon's radius, describe the circle BCD for the moon. And with the radius SD (equal to the sum of the sun and moon's horizontal parallaxes — the sun's semidiameter, all in minutes), describe the circle DEB , from the centre S , then this circle will represent the earth's dark shadow. Likewise with the same centre S , and radius SF (equal to the sum of the sun and moon's parallaxes + the sun's semidiameter, in minutes), describe the circle FQG ; and this will be the earth's penumbra.

(616.) VII. These rules being observed, it will be easy to find all the requisites by scale and compasses, by measuring them; or rather by calculation, in the several right-angled plain triangles, contained in the scheme. Thus, to find when the moon first touches the penumbra at L ; in the right angled triangle SPK , there is given SP , and SK (the sum of the radii SL and PB), to find PK . Which being known, the time of the moon's passing through it will be known, by the moon's horary motion from the sun.

(617.) To find when the moon first enters the dark shadow of the earth in D : In the right angled triangle SPI , there is given SP , and SI (the sum of the radii SD , PB) to find PI ; and conse-

quently the time of half the duration in the shadow.

(618.) To find the digits or 12th parts of the moon eclipsed. Here no the part eclipsed is =

$$Sn + Po - SP; \text{ and } \frac{12no}{2Po} \text{ or } \frac{6no}{Po} \text{ is the number of}$$

digits eclipsed. In TOTAL ECLIPSES of the moon, the earth's shadow often reaches further than the moon. And then more than 12 digits are said to be eclipsed, supposing the moon's disk to be produced so far.

(619.) To find the time when the moon wholly enters into the dark shadow BED , follow the same method as when it entered into the penumbra GQF . This will be evident, by supposing GQL the dark shadow. In that case SI will be the difference of the semidiameters of the moon and dark shadow. The times of passing through PI , PK , &c. being known, and the time of the middle of the eclipse at P ; the beginning and ending will be known.

(620.) VIII. Hence, if the moon of circle CB never touches the circle GQF , there will be no eclipse, not even by the penumbra. And if the same circle never touches the circle BDE , there will be no part of the moon totally eclipsed. And if the whole circle CB enter into the circle BED , the whole moon will be totally eclipsed; and that is when SP is less than the difference of the semidiameters SD and PB . If the point S be in the node, then P falls upon S , and the eclipse is central. When only a part of the circle CB goes into the circle BED , the eclipse is a partial one, as in this figure.

(621.) IX. The time of the eclipse being known for any particular place, it is easy to know if it be visible at that place; by knowing if the moon be risen. Or the place will be known where the moon is vertical; and therefore it will be visible to all places, within a quadrant's distance from it.

(622.) X. If the spectator live in the place (or in the same longitude) which the tables are calculated for; he will see the eclipse at the time determined by the calculation. If not, he will see it an hour sooner for every 15° difference of longitude, that he lives west from it. And so much later, if he lives eastward; that is, in the way of reckoning time. But in regard to absolute time, it is seen from all places at the same instant.

(623.) EXAMPLE. To FIND the TIME of the LUNAR ECLIPSE, December 23, 1769; its DURATION and DIGITS ECLIPSED.

1. The mean time of the syzygies, by the tables, is found to be Dec. 22d. 19h. 27m. at which time the moon's horary motion from the sun is $35' 33''$. At this time, computing the true places of the sun and moon, the moon will appear to be $35' 10''$ before the sun. And therefore the time is past the syzygy, 59m. 12s. Therefore,

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| From 1d. | 19h. | 27m. | 0s. |
| Take 0 | 0 | 59 | 12 |
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| True time 1 | 18 | 27 | 48 |
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The places being computed again, the moon is only 7" before the sun, which amounts to 12s. of time; therefore the time of opposition is 12d. 18h. 27m. 36s. which reduced to apparent time is Dec. 12d. 18h. 32m. 51s.

| | | |
|-----------------------------|---|----------------|
| 1. The sun's place is | - | 8° 21' 37" 35" |
| The moon's place | - | 2 21 37 35 |
| Place of the ascending node | 8 | 14 46 13 |
| Her latitude south | - | 37 58 |
| The sun's horary motion | | 2 33 |
| The moon's horary motion | | 38 6 |

3. Hence the moon is 6° 51' 22" past the descending node; that is $\odot S$ is 6° 51' 22". Therefore $\odot A = 27' 32"$, and $AS = 6° 23' 50"$. Therefore the angle $SMA = 84° 22' 28"$.

4. Hence drawing the ecliptic RS , and SM perpendicular to it, and equal to 37' 58" from a scale of minutes, as in Fig. 3. PLATE XXX. and making the angle $SMA = 84° 22' \frac{1}{2}$. We find the perpendicular $SP = 37' 47"$, and $MP = 3' 43"$. And therefore, the horary motion of the moon from the sun being 35' 33", PM will be passed over in 6' 17". And since this is before the opposition at M , this time must be deducted from the time of opposition. And the time of the middle of the eclipse will be Dec. 12d. 18h. 26m. 34s.

| | |
|------------------------------------|---------|
| 5. The sun's apparent semidiameter | 16' 20" |
| His horizontal parallax | 12 |
| The moon's apparent semidiameter | 16 48 |
| Her horizontal parallax | 62 7 |

6. Hence the radius $BP = 16' 48"$.
 Radius $SD = 44 59$.
 Radius $SP = 77 39$.

7. Hence also PK or $Pk = 86' 34"$.
 and PI or $Pi = 48 53$.

and therefore the time of passing through PK is 2^h 26' 6", and through $PI = 1^h 22' 30"$. And the whole duration in the shadow from I to i , is 2^h 45^m. And the digits eclipsed $8\frac{1}{2}$ on the upper side. Whence,

| | |
|-----------------------------|--|
| First ent. the penumbra | Dec. 13 ^d 4 ^h 0 ^m 28 ^s morn. |
| Entering the dark shadow at | 5 4 4 |
| Middle | 6 26 34 |
| Opposition | 6 22 55 |
| Leaving the shadow | 7 49 4 |
| Leaving the penumbra | 8 52 40 |
| Duration | 2 45 0 |
| Digits eclipsed | $8\frac{1}{2}$. |

(624.) All these calculations may be made sufficiently near, by scale and compasses, in a large draught; making use of a scale of minutes and sixtieth parts; or rather by making a scale of time answering thereto, by the help of the horary motion of the moon from the sun. For by this scale, the several hours and minutes may be marked along the line At , by which it will appear at what time the centre of the moon is at any given point. For the time is known when the moon is at M , and from thence the points at each hour and minute are easily found. And this construction, with only right lines and circles, will be exact enough in a large figure; for the best lunar tables give the times of the phases of an eclipse no nearer than to 4 or 5 minutes of time; and therefore such a

construction is sufficient to answer the purpose. Hence it may be observed that no eclipse of the moon can last above $5\frac{1}{2}$ hours, from the moon's first touching the earth's penumbra, to its last leaving it. For $SK = 94' 27" = 94.45$, and the ho-

rary motion is $35' 33" = 35.55$ and $\frac{94.45}{35.55} = 2.66 =$

2^h 39^m = semiduration; and no eclipse of the moon, by the earth's shadow, can last above $\frac{1}{2}$ hours. Nor when total, above $1\frac{1}{2}$ hours. For

$SI = 61' 47" = 61.78$, and $\frac{61.78}{35.55} = 1.745 = 1$

45" = the semiduration and $SD - SI = 18' 11" = 18.18$, and $\frac{18.18}{35.55} = .51 = 47^m$, the semidura-

(625.) The refraction of the earth's atmosphere, in lunar eclipses, makes the shadow less; by bringing the rays, which terminate the shadow, sooner to a point. And hence comes that red colour of the moon even in total eclipses. But that light must be very dim, by reason a great number of the rays are stopt and lost in the earth's atmosphere.

(626.) The circles terminating the shadow and the penumbra BED and GQF , cannot be distinguished. For the darkness from BED , diminishes by insensible degrees, to GQF , being darkest at E , and lightest at Q , where it vanishes insensibly. And therefore the moon does not appear to be eclipsed, till she is a good way within the penumbra. For that reason, there may happen eclipses of the moon which cannot be discovered as such.

(627.) All lunar tables shew the moon's place in eclipses, more truly in the syzygies than in the quadratures, or any other place. For the times of the syzygies, and the moon's place, have been more accurately observed in eclipses, than at any other time; and from thence the moon's theory has been deduced. Besides, many of the inequalities cease in the syzygies, but have sensible effects in other places; becoming greater, as the moon is further from the syzygies; being greatest in the quadratures. Whence the lunar tables do not determine the moon's place truly in the quadratures. And her place calculated from these tables is not so exact in the quadratures as in the syzygies.

(628.) Several inequalities depend on the aspect of the nodes and the sun; but these cease when the nodes are in the syzygies. When the moon and the nodes are in the syzygies; the moon's place, then wanting fewer equations, as being subject to fewer inequalities, will be more correct, than when she is in other places, where there are more and greater inequalities, and more equations; which equations have never been truly fixed. From hence more errors will happen out of the syzygies than in them.

V. To FIND the WAY of the MOON from the SUN, in a SOLAR ECLIPSE, supposing the OBSERVER at REST.

(629.) Let HZO , in PLATE XXXI. fig. 2, be the meridian of the place, HO the horizon, EC the equinoctial, EL the ecliptic, Z the zenith, P the pole, S and M the places of the sun and moon

in conjunction, PSD the sun's meridian. Having found the sun's distance from the node, $\odot S$, and the moon's latitude SM, &c. take $\odot A$ to $\odot S$, is the sun's horary motion, to the moon's horary motion; than SA is known. Draw MA; then in the spherical triangle ASM, right-angled at S, there is given SA, SM; to find the angle SMA; AM being the moon's way from the sun.

(630.) But, as the eye of the observer is in motion, by the rotation of the earth; which gives an apparent motion to the moon, contrary to that of the observer; we must find the quantity and direction of that motion. As the observer is carried eastward, towards the point C, the apparent motion in the moon caused thereby will be in the line CS. And to determine the position of CS in respect of AM or SM, several spherical triangles must be resolved, as follows.

(631.) In the right-angled triangle EDS, there is given ES and angle E to find DS and angle ESD or ASP; or these may be easier had from the astronomical tables. And in the triangle ZPS, there is given PS (the complement of DS), the angle ZPS (from the time of the day), and ZP the complement of the latitude; to find ZS, and angles PZS and ZSP. Then ZSP and ASP being known, ZSA will be known. And MSA being a right angle, ZSM will be known. In the right angled triangle CFS, there is given CF, the measure of the angle FZC (the difference between the angle PZS and the right angle CZP), and SF the complement of ZS; to find CS, and the angle CSF or BSZ. Then BSZ and ZSM being known, BSM will be known. And SMA being known, its supplement SMB is known, and consequently the angle SBM.

(632.) To find the quantity of the motion. That along AM is already known; and to find the apparent motion along SB. The sine of 15° is the horary motion of a point in the equinoctial is .259 to the radius 1. And if b be the moon's horizontal parallax, then the radius of the earth appears at the moon under the angle b , and therefore 15° of the equinoctial appears under the angle of $259b$; this then is the horary motion of a point in the equinoctial, viewed directly from the moon. And the moon's apparent motion seen from that point in the equinoctial is the very same. But this motion is to be diminished upon two accounts. 1. Because it is less in a parallel circle, in proportion to the cosine of the latitude. And 2. Upon account of the obliquity of the motion, when not perpendicular to the rays of the sun; and this will be as the sine of CS, the sun's distance from the east or west point of the horizon. Therefore to find the quantity of this motion.

To the logarithm of .259b

Add the cosine latitude

And the sine of CS.

Then the sum, abating twice radius, is the logarithm of this apparent horary motion. Then this motion is to be compounded with the motion along AMB as follows.

(633.) Let AS, PLATE XXXI. fig. 3, be a portion of the ecliptic, SB the way of the apparent motion, MA the moon's way from the sun. Draw NM parallel to SB; and let MN be the horary motion along SB or MN, and MI the horary mo-

tion of the moon from the sun. Then complete the parallelogram NMIQ; draw the diagonal MQR, which is the direction of the motion, compounded of the observers and the moon's motions, and MQ is the total apparent horary motion, supposing the observer at rest. Then in the plain triangle QMI, there is given MI, and IQ (or MN), and the angle MIQ = MBS; to find the angle QMI, and side MQ or the absolute horary motion. And the angles QMI and IMS being known, QMS is known.

(634.) If the sun be in the eastern hemisphere, in which case the concave side of the eastern hemisphere is here projected (in fig. 2.), then the moon's motion from the sun is from M towards A, and the other apparent motion from S towards B, or from M towards N. But if the sun is in the western hemisphere, this projection represents the convex side of the sphere; and then the moon moves from the sun, in direction AM, and the other apparent motion is from S toward C, being contrary.

VL To CALCULATE SOLAR ECLIPSES.

(635.) The eclipses of the sun are more difficult to calculate, than those of the moon; the latter being clear of parallaxes, which the former are incumbered with, which gives a great deal of trouble. But a great part of it may be avoided by using *projections* instead of calculations. The rules are,

(636.) I. Find the true time of the conjunction, and the places of the sun and moon at that time.

(637.) II. Having found the way of the moon from the sun by projection or calculation; find, by the astronomical tables, the moon's horizontal parallax, her apparent diameter, and horary motion; also the sun's apparent diameter, and horary motion. But, to avoid a great deal of calculation, if the sphere be projected by a large scale, it will give all the requisites with sufficient exactness, by measuring the several angles and sides, without any calculation, or very little. And here it is best to project the concave side, and then every thing appears as it is in nature.

(638.) III. Find the moon's parallax of altitude, by making as rad : cos. altitude :: so the moon's horizontal parallax : to her parallax of altitude Vg or Mm. fig. 4. Then find her parallax of latitude Mn, and longitude Ss, or mn, and from thence her apparent latitude and longitude is known.

(639.) IV. Draw the line SL, fig. 5. for the ecliptic, and from a large scale of minutes, erect SM perp. to LS, and equal to the apparent latitude; make the angle SMR, as found in the last prob. and draw \odot MR for the moon's apparent path. From S let fall SP perpendicular to MR, and SP will be the least distance of the centres of the sun and moon, or the middle of the eclipse. From the centre S with the radius equal to the minutes contained in the sun's semidiameter, describe the circle ABC for the sun. And from the centre P, with the radius equal to the moon's semidiameter, describe the circle AOCD for the moon. If these circles do not intersect, there will be no eclipse. But if they intersect, an eclipse must necessarily happen.

(640.) V. Then P is the place of the moon in the middle of the eclipse. Make SI and SK equal

ASTRONOMY. PART IV.

724
to the sum of the semidiameters of the sun and moon; and the moon's centre will be at I when the moon first touches the sun, or at the beginning of the eclipse. And K the place of the moon's centre, at the end of it. In the triangle PGI, there is given PI, SP; to find PK = PK, which reduced to time, by help of the moon's apparent hourly motion, shows half the duration of the eclipse; and consequently we shall have the beginning and end.

(643.) VI. And to find the quantity m , or the digits eclipsed; we have $m = \frac{1}{2} SA + \frac{1}{2} PS - SP$, and $\frac{5m}{16}$ is number of digits.

(642.) VII. The time found being *mean time*, it must be reduced to the *common or apparent time*, by the equation of time. And if the given place be not that for which the tables are made, add so much time, if the place lie eastward to the time of conjunction, as answers to the difference of meridians; or subtract it, if it lie westward.

(643.) EXAMPLE.

To FIND the TIME of the SUN'S ECLIPSE, June 4, 1769, its DURATION and DIGITS ECLIPSED at LONDON.

1. By the tables the mean time of the conjunction is found to be June 3^d 20^h 41^m. And hence the true time of conjunction is June 3^d 20^h 27^m 23^s. and the places are $51^{\circ} 51' 21''$. And the moon's lat. $53^{\circ} 22'$ north. The moon's motion from the sun $35' 47''$.

2. In fig. 2 and 3, Plate XXXI, the angle $AMS = 84^{\circ} 27'$, $ZSM = 35^{\circ} 20'$, $CSF = 3^{\circ} 19'$, $SBM = 60^{\circ} 43'$, $SP = 45^{\circ} 16'$, $CP = 3^{\circ} 34'$, $CS = 95^{\circ} 54'$. The angle $QMI = 8^{\circ} 25'$, $SMQ = 91^{\circ} 39'$, BN or $IQ = 6^{\circ} 38'$, $MQ = 31^{\circ} 20'$. Also

| | |
|--------------------------------|------------|
| The moon's horizontal parallax | $60' 38''$ |
| Her apparent diameter | $33' 28''$ |
| Her hourly motion | $38' 18''$ |
| The sun's diameter | $31' 41''$ |
| His hourly motion | $3' 23''$ |

3. In fig. 4, the moon's parallax in altitude Mm , is $47' 09''$; her parallax in latitude Ms , $38' 05''$; her remaining latitude Sm , $21' 26''$; her parallax in longitude Ss , $24' 23''$; which is increased 60 much.

4. Draw SL for the ecliptic, as in fig. 1; at any point S , erect the perp. MS equal to $17' 26''$, the moon's apparent latitude; through M draw the moon's way QMR , making the angle $SMR = 90^{\circ} 54'$. Draw SP perp. MR , which here falls very near M . From the centre S , with the radius $SA = 151' 50''$ describe the circle ABC for the sun. And with the radius $MD = 16' 46''$, and centre P , describe the circle $ADCQ$ for the moon. Hence PI or $PK = 27' 23''$. And the time of moving through IP or PK , at the rate of $31' 20''$ an hour, is $51^m 45^s$, for the semiduration. — By reason of the parallax ($24' 23''$), it is past the apparent conjunction; the difference being what the parallax causes, which comes to $46^m 23^s$. Therefore the middle of the eclipse is 15 much sooner, being at $2^h 20^m 41^s$ too. Thus reduced to apparent time is $3^h 29^m 43^s$ 276, for the mid-

6. The digits eclipsed are $5 \frac{1}{2}$, nearly.

(644.) In this example, the concave side of the sphere is projected, which suits best to the appearance of the heavens. And the figures we draw upon that supposition. It appears from the process, that the moon is advancing to her defacing node, and therefore has north latitude. And by the position of that part of the eclipse, her parallax in longitude, advances her so much inward, viz. $24' 23''$. And therefore she will pass the apparent conjunction. Hence we may state several particulars, as to the eclipse.

(645.) I. The begin. June 4th 6^h 30^m 43^s 276 middle, $7^h 43' 13''$ end, $8^h 46' 11''$ total duration, $2^h 15' 32''$ digits eclipsed $5 \frac{1}{2}$ on the upper side of the sun, towards the left; as appears by the figs.

(646.) II. Hence the positions of the nodes C and A , are easily found in the middle of the eclipse. For they are in a position parallel to the moon's way.

(647.) III. The middle of the eclipse will be at the same time in all places of the same longitude. For the parallax of longitude will be the same in different places.

(648.) No eclipse of the sun can last above 90 minutes. For SI or $SA + MD = 17' 26'' + 16' 46'' = 34' 12'' = 11' 12''$ and the hourly motion is $34' 47'' = 11' 12''$ and $\frac{21.6}{35.78} = .61 = 54\frac{1}{2}$ minutes, for the semiduration.

(649.) If it were not for the parallax, eclipsed the sun would be as easily calculated, as that of the moon. And in order to get the parallax, the angle ZSM and SP must be known fig. 2, and occasion the refusing several spherical triangles before they can be had. Likewise it may be observed, that the apparent way of the moon is not a curve line, concave towards S , which arises from the parallel of latitude being a curve, and the moon being out of its plane. Likewise the moon's apparent velocity is something greater at the beginning than at the end.

VI. RULES for CALCULATING a GENERAL ECLIPSE of the SUN.

(650.) The elements necessary for this are 1. The sun and moon's place, and the time, of the true conjunction; 2. The moon's latitude, horizontal parallax, diameter, and hourly motion; 3. The sun's declination, diameter, and hourly motion; And 4, the angle the moon's way makes with a circle of latitude.

(651.) II. From a large scale of *moons*, set the moon's horizontal parallax at the conjunction, and at any point C , in the right line MD , to represent the ecliptic in Plate XXXI, fig. 1, describe the circle $A.B.E.D.$ for the earth's disk, or the earth's flat face as it appears at a distance, a line drawn to the sun. Draw CM perpendicular to CD , and equal to the latitude of the sun upwards, if north. Make the angle CMB equal to that which the moon's way makes with the circle of latitude; acute so the right line MB tend to the node; or obtuse, if the line be past it, and drawing EMQ , it will be the way of the centre of the moon's shadow upon the earth. P. 725

ASTRONOMY.

PLATE II.

Fig. 1. Planctarium by Jones.



Let fall CH perpendicular to FG. Then at H will be the middle of the earth's eclipse.

(652.) III. With the centre H, and radius HO, equal to the sum of the semidiameters of the sun and moon, describe the circle QOR, which will be the moon's penumbra. Also describe a small circle round the centre H, whose radius is the difference of the sun and moon's semidiameters, that little circle will be the dark shadow of the moon. Then all the countries of the earth contained in the segment VAW will be successively eclipsed, by the penumbra, as the shadow moves along the tract FG; while the other segment FEW suffer no eclipse at all. All places in the line st, will be totally eclipsed, as the dark shadow, or the small circle at H passes successively over them. But this circle, or dark shadow, being very small, a total eclipse at any place continues but a small time. Sometimes the sun's semidiameter exceeds the moon's; and then there will be no dark circle, or total eclipse, but a lucid ring will appear about the moon in these places; and this is called an *annular eclipse*. The difference between the semidiameters of the sun and moon is so little, that no total eclipse lasts above 4 minutes.

(653.) IV. Draw CF, CO = sum of the semidiameters of the sun and moon, and the moon's parallax; then the moon's shadow will touch the earth at L and K where the eclipse begins and ends. In the triangle CFH, there is given CF, CH; to find FH = HG, which converted into time, gives half the duration, or half the time that the moon's shadow is upon the earth. Also, NO measured, shews how far the eclipse reaches. Or CO measured does the same. It may be sufficient to measure all these by the scale without calculation.

(654.) V. To find the POLE. Draw the arch AP, making the angle KAP equal to the sun's longitude, and AP the distance of the poles of the equator and ecliptic, $23^{\circ}\frac{1}{4}$; then P is the pole. For AP is a part of the solstitial colure, and passes through Cancer and Capricorn. And CAP is what the sun want of Cancer, therefore PAK is what it is past Aries. Through P draw CPT. And here we may suppose that the pole P is fixed, during the time of an eclipse. Then in the right angled spherical triangle APT, there is given AP and angle A; to find AT or angle ACP. In this triangle PT is the sun's declination, and APT or CPK his right ascension from Cancer. Here note, that any place in the line CT is in the sun's meridian. And C is the place where the sun is vertical at the time of the eclipse.

(655.) VI. To find the SITUATION of any given place, at a given hour. Make the angle CPX (with the sun's meridian), equal to the time from noon; on the left hand, if it is before noon. And make PZ the complement of the latitude; then Z is the place required. And if it falls in the penumbra, it is eclipsed; or any where in the segment VAW; if its motion in the parallel circle do not carry it out, before the penumbra reaches it.

(656.) VII. To find the place which is first or last touched by the penumbra, as K. Draw the arch PK. In the triangle CGH, there are given CG and CH, to find the angle GCH,

from which subtract HCP which is known, gives the angle PCK or TK. Then in the right angled spherical triangle PTK, there is given TK, and PT the sun's declination; to find PK the complement of the latitude of K, and TPK or CPK the difference of longitude of K, and the sun. Therefore its longitude and latitude is obtained. In the same manner may be found that of L. And by the same method the latitude and longitude of the places s and t may be found, where the dark shadow first enters the earth's disk, or quite leaves it. Thus also may be found the place which is in the line FH, at any point of time; or if the place be given, what the time will be; and that by help of the horary motion, with other particulars of like nature.

(657.) VIII. The part of the sun's diameter eclipsed by the moon, is known by the situation of the place within the penumbra, or its distance from the centre of the penumbra. And the phasis of the eclipse, as seen from any place Z, upon the disk, will be found thus, for any time. Find the centre of the shadow for that time, as suppose at H. Describe about H, a circle whose radius is the moon's radius; and about Z, a circle with the sun's radius. Then the part cut off the sun's circle will be the part obscured.

SECT. VIII. REMARKS ON ECLIPSES in GENERAL.

(658.) In eclipses of the moon, even when she is near the centre of the earth's shadow, her body is still visible and appears of a tarnished *copper colour*. This seems to be occasioned by the rays of light which come from the sun, and which, passing near the earth, are inflected from their rectilinear course by our atmosphere; so that they enter the earth's conical shadow, and thus produce that faint illumination on the surface of the moon, which some have supposed to be her own native light: but there seems to be no just ground for such a conjecture.

(659.) In most solar eclipses, the moon's disk is covered with a faint light, which is attributed to the reflection of the light from the illuminated part of the earth, and in total eclipses, the moon's limb is seen surrounded by a pale circle of light; which some astronomers consider as an indication of a lunar atmosphere, but others as the atmosphere of the sun; because it is observed to move equally with the sun, but not with the moon.

(660.) ECLIPSES have in all ages greatly attracted the attention of mankind. The ignorant and superstitious have viewed them with terror, and in former ages they were often considered as the forerunners of national calamities. The CHINESE, even at the present day, upon their appearance, perform the most absurd and superstitious ceremonies, although they are so far acquainted with their nature, as to be able to predict them. See CHINA. But true philosophy has taught us, that instead of these appearances being portentous of evil to mankind, they may, by proper observations upon them, be made of great advantage to the sciences, and to some of the arts of life.

(661.) We have already shewn, that, by eclipses of the moon, the earth is demonstrated to be a globular figure. The longitudes of places on the

world are also determined by observations on solar and lunar eclipses; as will appear by consulting the articles *GEOGRAPHY*, *LONGITUDE*, *NAVIGATION*, &c. Eclipses are also of great importance in *CHRONOLOGY*, (which see,) as by them we are enabled to determine exactly the time when events recorded in history happened.

(642.) From observations made upon the ancient eclipses, it appears, that the *PERIOD* of the moon is now shorter, and consequently that her distance from the earth is now less, than in former ages; and this has been considered as an argument against those who assert, that the world may have existed from eternity; for it was hence inferred, that the moon moves in a retarding medium, and therefore that her motion must by degrees be all destroyed, as which case she must at last come to the earth. But M. DE LA PLACE has shown, that this acceleration of the moon's period is a necessary consequence of universal gravitation, and that it arises from the action of the planets upon the moon. He has also shown, that this acceleration will go on, till it arrive at a certain limit, when it will be changed into a retardation; or in other words, that there are two limits, between which the lunar period fluctuates, but neither of which it can pass.

(643.) M. DE LA PLACE has also discovered, that all the known irregularities in the motions of our system are periodical; so that although the obliquity of the ecliptic, the eccentricities of the planetary orbits, the precession of the equinoxes, the length of the year, &c. may change, yet these changes will not pass certain limits, and after stated periods, they will return precisely to what they had formerly been. Some of these periods, however, may be very long. The acceleration of the moon, for example, has been going on from the earliest ages of astronomy to the present day.

(644.) We cannot close this section, without observing, that eclipses happen very frequently to the *SARABATAS* of JUPITER; and, as they are of great service in determining the longitude of places on the earth, astronomers have been at pains to calculate tables for the eclipses of these satellites, by their primary, for the satellites themselves have never been observed to eclipse one another. But this falls more properly to be considered under the articles *GEOGRAPHY*, and *LONGITUDE*, to which the reader is therefore referred.

(645.) The primary planets would also eclipse one another, were it not for their great distances; but as the comets are not subject to the same laws with the planets, it is possible they may sometimes approach so near to the primary planets, as to make an eclipse of the sun to those planets; and, as the body of a comet bears a much larger proportion to the bulk of a primary planet than any secondary, it is plain, that a cometary eclipse would both be of much longer continuance, and attended with greater darkness, than that occasioned by a secondary planet. If we suppose the primary planet and comet to be moving both the same way, the duration of such an eclipse would be prodigiously lengthened; and thus, instead of four minutes, the sun might be totally darkened to the inhabitants of certain places for as many hours: and, from this cause, some account for

that prodigious darkness, which we sometimes read of in history, at times when no eclipse of the sun by the moon, could possibly happen.

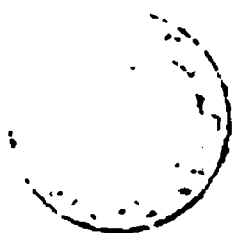
PART V.

ASTRONOMICAL MACHINERY AND INSTRUMENTS.

SECT. I. DESCRIPTION of the ASTRONOMICAL MACHINERY essential for ILLUSTRATING the SCIENCE.

(646.) THE GREEN OBSERVATORY, a very magnificent machine, first made in this kingdom, by Mr. Rowley, for King George I. is represented in Plate XXXIII. fig. 1. The frame of it, and contains the wheel-work, &c. and requires its whole machine, is made of ebony, and contains four feet in diameter. Above the frame is a wall ring, supported with 12 pillars, which revolve upon the plane of the ecliptic. Above the circular frame of the principal circles of the system, viz. No. 10, are the two circles, divided into degrees, and half degrees; No. 11, is one half of the equinoctial circle, making an angle of 90 degrees. The tropic of Cancer, and the zodiac circle, are each fixed parallel, in their proper distance from the equinoctial. On the contrary side of the ecliptic, is a brass hemisphere, divided upon two points, fixed in 90 and 20, representing the moving horizon to be put to any latitude upon the north part of the meridian, and the whole machine may be set to any latitude without disturbing any of the external motions by two strong hinges, (No. 12.) fixed to the bottom frame, upon which the instrument rests, and a strong brass arch, having holes at each end, through which a strong pin is put to regulate elevation. This arch, and the two hinges, support the whole machine, when it is fixed upon according to any latitude; and the arch, at the same time, lies conveniently under the bottom frame.

(647.) The Sun, (No. 1.) stands in the middle of the whole system, upon a wire, making an angle with the ecliptic, of about 60 degrees. Next the Sun is a small ball, (2.) representing Mercury. Next to Mercury is Venus, (3.) represented by a larger ball. The Earth is represented (No. 4.) by an ivory ball, having some circles on a map sketched upon it. The wire which supports the Earth, makes an angle with the ecliptic of 66½ degrees, the inclination of the earth's axis to the ecliptic. Near the bottom of the Earth's axis is a dial plate, (No. 5.) having a wire pointing to the hours of the day, and the first turns round its axis. Round the Earth is a ring supported by two small pillars, representing the orbit of the moon; and the division upon it shew to the moon's latitude. The motion of the ring represents the motion of the moon's orbit according to that of the nodes. Within this ring is the moon, (No. 6.) having a black cap or disk by which its motion represents the phases of its moon, according to her age. Without the axis of the Earth and Moon, is Mars, (No. 7.) The next in order to Mars is Jupiter, and so of moons (No. 8.) Each of these moons is supported by a wire fixed in a socket, which turns round



the pillar supporting Jupiter. These satellites may be turned by the hand to any position, and yet, when the machine is put into motion, they will all move in their proper times. The outermost of all is Saturn, his five moons, and his ring (No. 8.) These moons are supported and contrived, similar to those of Jupiter.

(668.) The machine is put into motion, by turning a small winch, (No. 14.) ; and the whole system is also moved by this winch, and by pulling out, and pushing in a small cylindrical pin above the handle. When it is pushed in, all the planets, both primary and secondary, will move according to their respective periods, by turning the handle. When it is drawn out, the motions of the satellites of Jupiter and Saturn will be stopped, while all the rest move without interruption. There is also a brass lamp, having two convex glasses, to be put in room of the sun; and also, a smaller earth and moon, made somewhat in proportion to their distance from each other, which may be put on at pleasure. The lamp turns round, at the same time with the earth, and the glasses of it cast a strong light upon her; and when the smaller earth and moon are placed on, it will be easy to show when either of them will be eclipsed.

(669.) Mr FERGUSON'S ORRERY, fig. 2. shows the motions of the Sun, Mercury, Venus, Earth, and Moon; and occasionally the superior planets, Mars, Jupiter, and Saturn, may be put on. Jupiter's four satellites are moved round him in their proper times, by a small winch; and Saturn has his five satellites, and his ring, which keeps its parallelism round the sun; and by a lamp put in the Sun's place, the ring shows all its various phases already described. In the centre, No. 1, represents the Sun; No. 2, Mercury; No. 3, Venus; No. 4, the Earth; No. 6, is a sidereal dial-plate under the Earth; and No. 7, a solar dial-plate on the cover of the machine. The index of the former shows sidereal time, and of the latter, solar time.

(670.) The Earth always keeps opposite to a moving index, (No. 10.) which shows the Sun's daily change of place, and also the days of the months. The Earth is half covered with a black cap, for dividing the apparently enlightened half next the Sun, from the other half, which, when turned away from him, is in the dark. The edge of the cap represents the circle bounding light and darkness, and shows at what time the Sun rises and sets to all places throughout the year. The Earth's axis inclines $23\frac{1}{2}$ degrees from the axis of the ecliptic; by which means, the different lengths of days and nights, and the cause of the various seasons, are demonstrated to sight.

(671.) There is a broad horizon, to the upper side of which is fixed a meridian semicircle, in the north and south points. From the lower side of this thin horizontal plate stand out 4 small wires, to which is fixed a twilight-circle, 18 degrees from the graduated side of the horizon, all round. This horizon may be put upon the earth, (when the cap is taken away,) and rectified to the latitude of any place; and then by a small wire, called the *solar ray*, which may be put on, so as to proceed directly from the sun's centre towards

the earth's, but to come no farther, than almost to touch the horizon. The beginning of twilight, time of sun rising, with his amplitude, meridian altitude, time of setting, amplitude then, and end of twilight, are shown for every day of the year, at that place to which the horizon is rectified.

(672.) The Moon, (No. 5.) exhibits all the phases already described. When the horizon is rectified to the latitude of any given place, the times of the Moon's rising and setting, together with her amplitude, are shown to that place, as well as the sun's; and all the various phenomena of the harvest moon, are made obvious to sight. The Moon's Orbit, (No. 9.) is inclined to the ecliptic, (No. 11.) one half being above, and the other below it. The nodes, or points at \circ and \circ , lie in the plane of the ecliptic; as before described, and shift backward, through all its lines and degrees, in $18\frac{1}{2}$ years.

(673.) The degrees of the Moon's latitude, to the highest at NL, (north latitude,) and lowest at SL, (south latitude,) are engraven both ways from her nodes at \circ and \circ ; and, as the moon rises and falls in her orbit, according to its inclination, her latitude and distance from her nodes are shown for every day, having first rectified her orbit, so as to set the nodes to their proper places in the ecliptic; and then, as they come about, at different, and almost opposite times of the year, and then point towards the sun, all the eclipses may be shown for hundreds of years, (without any new rectification,) by turning the machinery backward, for time past, or forward for time to come.

(674.) At 17° distance from each node, on both sides, is engraved a small sun; and at 12 degrees distance, a small moon, which show the limits of solar and lunar eclipses; and when, at any change, the moon falls between either of these suns and the node, the sun will be eclipsed on the day pointed to by the annual index, (No. 10.) And when at any full, the moon falls between either of the little moons and node, she will be eclipsed, and the annual index shows the day of that eclipse. There is a circle of 29 $\frac{1}{2}$ equal parts, (No. 8.) on the cover of the machine, on which an index shows the days of the moon's age. There is a jointed wire, of which, one end being put into a hole in the upright stem that holds the earth's cap, and the wire laid into a small forked piece, which may be occasionally put upon Venus or Mercury, shows the direct and retrograde motions of these two planets, with their stationary times and places, as seen from the earth. The whole machinery is turned by a winch, (No. 12.) and is so easily moved, that a clock might turn it, without any danger of stopping.

(675.) Mr JONES'S PLANETARIUM, Pl. XXXII. fig. 1. represents in a general manner, by various parts of its machinery, all the motions and phenomena of the planetary system. This machine consists of, the Sun in the centre, with the planets, Mercury, Venus, the Earth and Moon, Mars, Jupiter and his four moons, Saturn and his five moons; and to it is occasionally applied an extra long arm for the planet Herchel and his two moons. To the earth and moon is applied

spine CD, containing only four wheels and two pulleys which serve to preserve the earth's axis in its proper parallelism in its motion round the sun, and to give the moon her due revolution about the earth at the same time. These wheels are connected with the wheel-work in the round box below, and the whole is set in motion by the winch H. The arm M that carries round the moon, points out on the plate C her age and phases for any situation in her orbit, and which accordingly are engraved thereon. In the same manner the arm points out her place in the ecliptic: λ , in signs and degrees, called her geocentric place. The moon's orbit is represented by the flat rim A, the two joints of which, and upon which it turns, denoting her nodes. This orbit is made to incline to any desired angle. The earth of this instrument is usually made of a three inch or 14 globe, papered, &c. for the purpose; and by means of the terminating wire that goes over it, points out the changes of the seasons, and the different lengths of days and nights more conspicuously. This machine is also made to represent the Ptolemaic system, or such as is vulgarly received; which places the earth in the centre, and the planets and sun revolving about it. This is done by an auxiliary small sun and an earth, which change their places in the instrument.

(676.) The true causes of the solar and lunar eclipses are here very clearly seen; for by placing the lamp, fig. 3, upon the centre, in room of the brass ball denoting the sun, and turning the winch until the moon comes into a right line between the centres of the lamp (or sun) and the earth, the shadow of the moon will fall upon the earth. On the other side, the moon passes (in the aforesaid end) through the shadow of the earth, and is by that means eclipsed. And the orbit A, fig. 2, is so moveable in the two joints called nodes, that any person may easily represent the due position of the nodes and intermediate spaces of the moon's orbit; and thence show when there will or will not be an eclipse of either imaginary, and what the quantity of each will be. While the moon is continuing to move round the earth, the lamp on the centre will so illuminate her, that at her phases, as new, dichotomized, gibbous, full, waning, &c. will be seen just as they appear in the heavens. All the same phases of the earth, as they appear at the moon, will also be exhibited. The latitudes of Jupiter and Saturn are moveable only by the hand; yet all their phenomena may be easily apprehended, excepting the true relative motions and distances.

(677.) The IMPROVED CELESTIAL GLOBE, is represented in PLATE XXXII fig. 4, on the fixed arch M.K.H. of 234 degrees; and at the end H is fixed an upright pin HG, which stands directly over the north pole of the ecliptic, and perpendicular to that part of the surface of the globe. On this pin are two moveable collars at D and O, to which are fixed the quadrant-like wires N and Q, having two little balls on their ends for D is fixed to the circular plate E, whereas the 294 days of the moon's age are engraved, beginning with the sun's wire M; and as this wire

is moved round the globe, the plate F turns round with it. These wires are easily turned, if the screw G be slackened; and when they are set to their proper places, the screw serves to fix them there, so as in turning the ball of the plate, the wire with the sun and moon go round with it; and these two little balls rise and set at the same time, and on the same points of the horizon, for the day to which they are rectified, as the sun and moon do in the heavens.

(678.) As the moon does not keep her course in the ecliptic, but has a declination of 54 degrees on each side from it in every lunation, her latitudes may be screwed as many degrees to either side of the ecliptic as her latitude or declination from the ecliptic amounts to any given time. The horizon is supported by two semicircular arches, because pillars would stop the progress of the ball when they go below the horizon in an oblique sphere. To rectify this globe, elevate the pole to the latitude of the place; then bring the ball's place in the ecliptic for the given day to the horizon meridian, and set the hour index at 12 noon, that is, to the upper 12 on the hour circle; keeping the globe in that situation, turn the screw O, and let the sun directly over his place in the meridian; which done, let the moon's wire under the number that expresses her age for that day on the Plate F, and she will then stand at her place in the ecliptic, and show what declination she is in. Lastly, fasten the screw G and adjust the moon to her latitude, and the globe will be rectified.

(679.) The TRAJECTORY OF LUNAR, fig. 5, is intended, by delineating the paths of the earth and moon, to show what sort of curves they make in the ethereal regions. S is the sun, and E is the earth, whose centres are 95 inches distant from each other; every inch answering to 1,000,000 of miles. M is the moon, whose centre is 14 parts of an inch from the earth's in this model, this being in just proportion to the moon's distance from the earth. AA is a bar of wood, to be moved by hand round the axis g, which is fixed at wheel Y. The circumference of this wheel is the circumference of the small wheel L, (below at other end of the bar) as 1851 days to 194, which is a year to a lunation. The wheels are moved round their edges, and in the grooves is an edge string GG crossing between the wheels at L. On the axis of the wheel L is the index I, which is fixed the moon's axis M for computing round the earth E (fixed on the axis of the wheel L) in the time that the index goes round 1, one of 294 equal parts, which are the days of the moon's age. The wheel Y has the months of the year all around its rim; and a dial bar AA is fixed the index I, which points out the days of the months answering the day of the moon's age, shown by the index, F, is the end of 294 equal parts at the other end of the bar. On the axis of the wheel L is put the piece D, below the cock C, in which this axis turns round; and in D are put the pencils, and as directly under the earth E and moon M; so that as the wheel round, as M is round E.

(680.) Lay the machine on an even floor, putting gently on the wheel Y, to omit in great

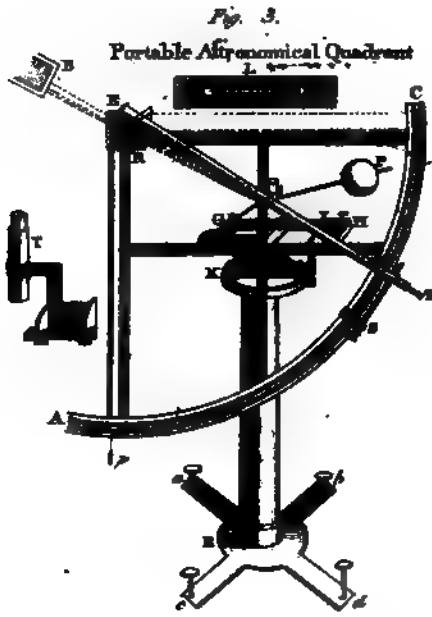
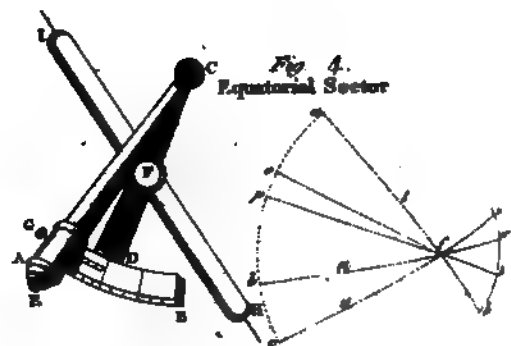


Fig. 4.



Fig. 5.



over the weight of the telescope when he lifts, and hinders him from either forcing or relaxing the instrument. The lower extremity of the telescope is furnished with two small wheels, which take the limb of the quadrant on its axis. The telescope hardly bears any more up the limb than the small friction of these wheels, which renders its motion, in extreme easy and pleasant, that by giving it with the hand only a small motion, the telescope will run of itself over a great part of the limb, balanced by the counterpoise N.

(600.) When the telescope is to be stopped at a certain position the copper band T is to be made use of, which embraces the limb and springs at the bottom. It is fixed by a setting screw, which fastens it to the limb. Then, in turning the regulating screw, the telescope will be advanced; which is continued until the star or other object whose altitude is observing be on the horizontal line thread in the telescope. Then on the plate X supporting the telescope, and carrying a vernier or nonius, will be seen the number of degrees and minutes, and even quarter of minutes, that the angular height of the object observed is equal to. The remainder is easily estimated within two or three seconds nearly.

(601.) There are several methods of subdividing the divisions of a mural quadrant, which are usually from five or ten minutes each; but that which is most commonly adopted is by the vernier or nonius, the invention of PIERRE VERNIER, a Frenchman. This vernier consists of a piece of copper or brass, CDAB, fig. 1, which is a small portion of X, fig. 1, represented separately. The length CD is divided into 30 equal parts, and placed contiguously on a portion of the division of the limb of the quadrant containing 30 divisions, and thereby dividing this length into 30 equal parts. Thus the first division of the vernier piece marked 13, beginning at the point D, is a little backward, or to the left of the first division of the limb, equal to 15".

(602.) The second division of the vernier is to the left of the second division of the limb double of the first difference, or 30", and so on unto the twentieth, and last division on the left of the vernier piece, where the 30 differences being accumulated each of the twentieth part of the division of the limb, this last division will be found to agree exactly with the last division of the limb of the quadrant. The index must be pushed the 30th part of a division, or 15", to the right, for to make the second division on the vernier coincide with one of the divisions of the limb, in like manner in moving two 30ths, or 30", we must look at the second division of the index, and there will be a coincidence with a division of the limb. Thus the beginning D of the vernier, which is always the line of reckoning, has advanced two divisions, or 30" to the right, when the second division, marked 2 on the vernier, is here to correspond exactly with one of the lines of the quadrant.

(603.) The plate of copper which carries the telescope, is placed on the side of the quadrant, and carries two verniers. The outer line CD divides five minutes into 30 parts, or 15" each. The inner line AB answers to the parts of another

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it at F, so that the plane of the sector may be always parallel to the axis HI; which being parallel to the axis of the earth, the plane of the sector will always be parallel to the plane of some hour circle. Let a telescope CE be moveable about the centre C of the arch AB, from one end of it to the other, by turning a screw at G; and let the line of sight be parallel to the plane of the sector. Now, by turning the whole instrument about the axis HI, till the plane of it be successively directed, first to one of the stars and then to another, it is easy to move the sector about the joint F, into such a position, that the arch AB, when fixed, shall take in both the stars in their passage, by the plane of it, provided the difference of their declinations does not exceed the arch AB. Then, having fixed the plane of the sector a little to the westward of both the stars, move the telescope CE by the screw G; and observe by a clock the time of each transit over the cross hairs, and also the degrees and minutes upon the arch AB, cut by the index at each transit; then in the difference of the arches, the difference of the declinations, and by the difference of the times, we have the difference of the right ascensions of the stars.

(697.) The dimensions of this instrument are these: The length of the telescope, or the radius of the sector, is $2\frac{1}{2}$ feet; the breadth of the radius, near the end C, is $1\frac{1}{2}$ inch; and at the end D, 2 inches. The breadth of the limb, AB, is $1\frac{1}{2}$ inch; and its length, 6 inches, containing 10 degrees, divided into quarters, and numbered from either end to the other. The telescope carries a nonius or subdividing plate, whose length, being equal to 16 quarters of a degree, is divided into 15 equal parts; which, in effect, divides the limb into minutes, and, by estimation, into smaller parts. The length of the square axis, HIF, is 18 inches, and of the part HI, 12 inches; and its thickness is about a quarter of an inch: the diameters of the circles are each 5 inches: the thickness of the plates, and the other measures, may be taken at the direction of a workman.

(698.) This instrument may be rectified, for making observations, in this manner: By placing the intersection of the cross hairs, at the same distance from the plane of the sector, as the centre of the object-glass, the plane described by the line of sight, during the circular motion of the telescope upon the limb, will be sufficiently true, or free from conical curvity; which may be examined, by suspending a long plumb-line at a convenient distance from the instrument; and, by fixing the plane of the sector in a vertical position, and then by observing, while the telescope is moved by the screw along the limb, whether the cross hairs appear to move along the plumb line.

(699.) The axis, bfo , may be elevated, nearly parallel to the axis of the earth, by means of a small common quadrant; and its error may be corrected, by making the line of sight follow the circular motion of any of the circumpolar stars, while the whole instrument is moved about its axis, bfo , the telescope being fixed to the limb; for this purpose, let the telescope k be directed to the star a , when it passes over the highest point of its diurnal circle, and let the division cut by the nonius be then noted: then, after 12 hours,

when the star comes to the lowest point of its circle, having turned the instrument half round its axis, to bring the telescope into the position mn ; if the cross hairs cover the same star supposed at b , the elevation of the axis, bfo , is exactly right; but, if it be necessary to move the telescope into the position uv , in order to point to the star at c , the arch mu , which measures the angle mfu or bfc , will be known; and then the axis bfo must be depressed half the quantity of this given angle, if the star passed below b , or must be raised so much higher, if above it; and then the trial must be repeated, till the true elevation of the axis be obtained. By making the like observations upon the same star on each side the pole, in the fix o'clock hour-circle, the error of the axis, toward the east or west, may also be found and corrected, till the cross hairs follow the star quite round the pole: for, supposing $apbc$ to be an arch of the meridian, (or in the secondary practice of the fix o'clock hour-circle), make the angle afp equal to half an angle afc , and the line fp will point to the pole; and the angle ofp , which is the error of the axis, will be equal to half the angle bfc , or mfu , found by the observation; because, the difference of the two angles afp , afc , is double the difference of their halves afp and afp . Unless the star be near the pole, allowance must be made for refractions.

(700.) VIII. The TRANSIT INSTRUMENT is used for observing objects as they pass over the meridian, and consists of a telescope fixed at right angles to an horizontal axis, so supported that what is called the line of collimation, or line of sight of the telescope, may move in the plane of the meridian. The axis, AB, PLATE XXXIV. fig. 5. to which the middle of the telescope is fixed, is about $2\frac{1}{2}$ feet long, tapering gradually toward its ends, which terminate in cylinders well turned and smoothed. The telescope CD, which is about four feet and $1\frac{1}{2}$ inch diameter, is connected with the axis by means of a strong cube or die G, and in which the two cones MQ, forming the axis are fixed. This cube or stock G serves as the principal part of the whole machine. It not only keeps together the two cones, but holds the two sockets KH, of 15 inches length, for the two telescopic tubes. Each of these sockets has a square base, and is fixed to the cube by four screws. These sockets are cut down in the sides about eight inches, to admit more easily the tube of the telescope; but when the tube is inserted, it is kept in firm by screwing up the tightening screws at the end of the sockets at K and H. These two sockets are very useful in keeping the telescope in its greatest possible degree of steadiness. They also afford a better opportunity of balancing the telescope and rectifying its vertical thread, than by any other means.

(701.) To direct the telescope to the given height, that a star would be observed at, there is fixed a semicircle AN on one of the supporters, of about $8\frac{1}{2}$ inches diameter, and divided into degrees. The index is fixed on the axis, at the end of which is a vernier, which subdivides the degrees into 12 parts or five minutes. This index is moveable on the axis, and may be closely applied to the divisions by means of a tightening screw.

(708.) The azimuth circle may be made level, by turning the instrument, till one of the levels is parallel to an imaginary line joining two of the feet screws; then adjust that level with these two feet screws; turn the circle half round, *i. e.* 180° ; and if the bubble be not then right, correct half the error by the screw belonging to the level, and the other half error by the two feet screws; repeat this till the bubble comes right; then turn the circle 90° from the two former positions, and let the bubble right, if it be wrong, by the foot screw at the end of the level; when this is done, adjust the other level by its own screw, and the azimuth circle will be truly level. The hanging level must then be fixed to the brass rod by two hooks of equal length, and made truly parallel to it: for this purpose make the polar axis perpendicular or nearly perpendicular to the horizon; then adjust the level by the pinion of the declination semicircle; reverse the level, and, if it be wrong, correct half the error by a small steel screw that lies under one end of the level, and the other half error by the pinion of the declination semicircle; repeat this till the bubble be right in both positions.

(709.) To make the brass rod on which the level is suspended at right angles to the axis of motion of the telescope or line of collimation, make the polar axis horizontal, or nearly so: set the declination semicircle to 0° , turn the hour circle till the bubble comes right; then turn the declination circle to 90° ; adjust the bubble by raising or depressing the polar axis, first by hand till it be nearly right; afterwards tighten, with an ivory key, the socket which runs on the arch with the polar axis; and then apply the same ivory key to the adjusting screw at the end of the said arch, till the bubble comes quite right; then turn the declination circle to the opposite 90° ; if the level be not then right, correct half the error, by the aforesaid adjusting screw at the end of the arch, and the other half error by the two screws which raise or depress the end of the brass rod. The polar axis remaining nearly horizontal as before, and the declination semicircle at 0° , adjust the bubble by the hour circle; then turn the declination semicircle to 90° , and adjust the bubble by raising or depressing the polar axis; then turn the hour circle 12 hours; and if the bubble be wrong, correct half the error by the polar axis, and the other half error by the two pair of capstan screws at the feet of the two supports on one side of the axis of motion of the telescope; and thus this axis will be at right angles to the polar axis.

(710.) The next adjustment is to make the centre of cross hairs remain on the same object, while the eye tube is turned quite round by the pinion of the refraction apparatus. For this adjustment, set the index on the slide to the first division on the dovetail; and set the division marked 18" on the refraction circle to its index; then look through the telescope, and with the pinion turn the eye tube quite round; and if the centre of the hairs does not remain on the same spot during that revolution, it must be corrected by the four small screws, two and two at a time, which will be found upon unscrewing the nearest end of

the eye tube that contains the first eye glass; repeat this correction till the centre of the hairs remains on the spot looked at, during an entire revolution.

(711.) To make the line of collimation parallel to the brass rod on which the level hangs, set the polar axis horizontal, and the declination circle to 90° ; adjust the level by the polar axis; look through the telescope on some distant horizontal object, covered by the centre of the cross hairs; then invert the telescope, which is done by turning the hour circle half round; and if the centre of the cross hairs does not cover the same object as before, correct half the error by the uppermost and lowermost of the 4 small screws at the eye end of the large tube of the telescope. This correction will give a second object now covered by the centre of the hairs, which must be adopted instead of the first object: then invert the telescope as before; and if the second object be not covered by the centre of the hairs, correct half the error by the same two screws which were used before. This correction will give a third object, now covered by the centre of the hairs, which must be adopted instead of the second object; repeat this operation till no error remains; then set the hour circle exactly to 12 hours (the declination circle remaining at 90° as before); and if the centre of the cross hairs does not cover the last object fixed on, set it to that object by the two remaining small screws at the eye end of the large tube, and then the line of collimation will be parallel to the brass rod.

(712.) For rectifying the nonius of the declination and equatorial circles, lower the telescope as many degrees, minutes, and seconds, below 0° , or Æ , on the declination semicircle as are equal to the complement of the latitude; then elevate the polar axis till the bubble be horizontal, and thus the equatorial circle will be elevated to the co-latitude of the place; set this circle to 6 hours; adjust the level by the pinion of the declination circle; then turn the equatorial circle exactly 12 hours from the last position; and if the level be not right, correct one half of the error by the equatorial circle, and the other half by the declination circle; then turn the equatorial circle back again exactly 12 hours from the last position; and if the level be still wrong, repeat the correction as before till it be right, when turned to either position; that being done, set the nonius of the equatorial circle exactly to 6 hours, and the nonius of the declination circle exactly to 0° . The principal uses of this equatorial are,

(713.) L. To find the meridian by one observation only: for this purpose, elevate the equatorial circle to the co-latitude of the place, and set the declination semicircle to the sun's declination for the day and hour required; then move the azimuth and hour circles both at the same time, either in the same or contrary direction, till the centre of the cross hairs in the telescope exactly covers the centre of the sun. When that is done, the index of the hour circle will give the apparent or solar time at the instant of observation; and thus the time is gained, though the sun be at a distance from the meridian. Then turn the hour circle till the index points precisely at 12 o'clock, and

BENARES, a celebrated observatory at, 12.
BERNOULLI, James, his opinion of comets, 178.
BEROSUS teaches astronomy in Coos, 28. honoured with a statue at Athens, *ib.*
BETTS, Mr, attempts to compute the transverse axis of a comet's orbit, 197. finds it nearly infinite,
BIRD, Mr, improves astronomical instruments, 58.
BLACK SEA has no sensible tides, 480.
BLISS, Dr, Astronomer Royal, 66.
BODIES of the sun and planets described, 332—336.
BODIN, John, his ridiculous opinion of comets, 177.
BRADLEY, Dr, discovers the aberration of the fixed stars, 57, 395. and of light, 62. his other discoveries, *ib.*
BRAHE, **TYCHO**, his discoveries, 48. builds an observatory, *ib.* frames a new system, *ib.* observes a new star, 83. his opinion of comets, 179. opposes the Copernican System, 258.
BRAMINS, antiquity and accuracy of their astronomy, 17.
BULK, proportional, of the sun and planets, 272.
BULL'S EYE, more southerly than the ancients placed it, 246.

C

CAILLE, M. DE LA, his astronomical improvements, 64.
CALCULATION of the distances, &c. of the celestial bodies, 522—541, 551—569.
CALIPPIC PERIOD corrected by Hipparchus, 31.
CALIPPUS, his astronomical improvements, 27.
CANCER, tropic of, described, 417.
CAPRICORN, tropic of, delineated, 419.
CARTESIAN System, account of the, 256.
CASPIAN SEA has no sensible tides, 480.
CASSINI, his improvements, 59. erects a gnomon, &c. *ib.* his opinion of the figure of the earth, 61. discovers the semita luminosa, 140. his conjectures respecting it, 142. traces the paths of Mercury and Venus, 558.
CELESTIAL BODIES, appearances of the, as seen by the

naked eye, 71—91. as seen through telescopes, 92—137. conclusions drawn from them, 138—247.
CELESTIAL GLOBE, the improved, description of, 677, 678.
CENTRIPETAL POWERS illustrated, 273.
CHALDEA, a country proper for astronomical observations, 19.
CHALDEAN, synonymous with Astronomer and Astrologer, 19.
CHALDEANS, early astronomers, 14, 19, 20.
CHINESE, said to have been taught astronomy by Noah, 8. their division of time, *ib.* of the zodiac, *ib.* and the heavens, *ib.* their method of marking the constellations, 9. antiquity of their astronomy, 8, 10, 11, 14. state of it, 8, 11. their superstition, 660.
CHRONOLOGY, eclipses useful in, 661.
CICERO, Copernicus takes a hint of the true system from, 257.
CIRCLES described by the planets, 347—355.
CLAIRAUT, M. his calculation of a comet, 201.
CLAVIGERO, M. his account of American astronomy, 18.
CLAVIUS writes a commentary on John de Sacro Bosco's work de Sphæra, 37.
COLD, cause of, in winter, 424—426.
COMETS, written on by Mullar, 40. observed by Werner, 42. and Hévelius, 46. their paths discovered by Kepler, 49. their places observed, and elements computed by Dr Bradley, 62. their number and appearances to the eye, 81. apparent magnitudes, 82. and motions, *ib.* appearances through telescopes, 130—134. of their tails, 132—134. conjectures respecting comets, 171—178. absurd opinions, 171, 176—178. conclusions drawn from observation, 180, 202. are opaque bodies, 183. of various magnitudes, 184. and distances, 185—187. periods of some comets, 196, 197. calculations respecting them, 196. Dr Halley's theory, 197, 198. number noticed, 260. their nature and motions, 327—331. said to occasion eclipses of the sun, 665.
CONDAMINE, M. and others set out to measure two degrees of the meridian, 61.

CONJUNCTION of Jupiter and Saturn, observed by Tycho Brahe, 48.
CONJUNCTIONS of planets defined, 359. mark of, 360.
CONSTELLATIONS, number of the Chinese, 8. how marked, 9. when first used by the Greeks, 23, 24. names of the ancient, 548. and modern, 549, 550. number of stars in each, 548—550.
COPERNICAN SYSTEM published, 43. improved, 44. account of it, 257—272. much opposed at first, 258. confirmed by Newton, 259.
COPERNICUS, Nicolaus, restores the true system of astronomy, 43. which he discovers from hints in ancient authors, 257. observes an eclipse, 566.
CRABTREE, Mr, sees the first transit of Venus ever observed, 52, 537.
CRYSTALLINE HEAVENS, an erroneous notion in the Ptolemaic System, 251.

D

DARKNESSES, extraordinary, supposed to be caused by comets, 187, 665.
DELUGE, supposed to have been caused by a comet, 195. relics of the flood, found at great depths in the earth, *ib.*
DENSITY of the whole matter in the earth, 68. proportional, of the sun and planets, 272, 345, 346.
DESAGULIERS, Dr, his illustration of the horizontal moon, 494.
DES CARTES, author of a new system, 256. his reason for the appearance of the horizontal sun and moon, 492.
DESCENDING NODE defined, 354, 577. mark of it, *ib.*
DIAMETERS of the sun and planets, 271.
DICHOTOMY of the moon, used by Aristarchus to determine the sun's distance, 29.
DIFFRACTION of rays, defined, 168.
DIRECT MOTION of a planet defined, 378.
DISTANCES, proportional, of the sun and planets, 270. how to calculate them, 522—541.
DIVISIONS of the Starry Heavens, 542, 546.
DIURNAL rotations of the sun and planets, 271. of the earth illustrated, 411—414.

lar, 306—319. illustrated, 320—326. is diffused through the whole substance of the celestial bodies, 332—344.

GRAVITY, various effects of, 275, 306. illustrated, 276—281. See GRAVITATION.

REEKS, probable origin of their astronomy, 23, 24. improvements of it, 25. Vitruvius's account of it, 28.

GREGORY, David, improves astronomy, 57.

GREGORY, James, points out an improvement of the telescope, 55. illustrated, 276—281.

H

HADLEY improves the telescope, 57. and invents a quadrant, ib.

HALLEY, Dr, examines Hevelius's instruments, 54. and makes observations along with him, ib. makes a catalogue of the fixed stars, 60. predicts the return of a comet, ib. discovers the acceleration of the moon, &c. ib. and recommends a method of determining the longitude, ib. predicts the transit of Venus, 65. his account of new stars, 84—89. makes tables of the comets, 197, 198. objections to his theory, 199, 200.

HAMILTON, Dr, his opinion of the use of comets, 193.

HARRIOT, Mr, his discoveries, 52. probably the first observer of the sun's spots, 93.

HARVEST MOON rises sooner than any other, 482. reasons of this, 483—488. goes through a course of more and less beneficial states, 489. prognostication of these for half a century, ib.

HEAT of comets, Newton's estimate of the, 194.

HEAVENS, general appearance of the, 74. divisions of the starry, 542—550.

HELIOCENTRIC CIRCLES defined, 347. and described, ib. 349.

HELIOCENTRIC LATITUDE defined, 355.

HERSCHEL, Dr, improves the reflecting telescope, 59. constructs very powerful ones, 69. discovers a new planet with satellites, ib. his observations on Venus, 107. and Mars, 108. he discovers two rings round Saturn, 122—124. a sixth and seventh satellite, 125. and vast numbers of nebulae, 137. he observes crup-

VOL. II. PART II.

tions of the lunar volcanoes, 158. forms a new theory of the universe, 210, 211. his observations of the stars, 212. the Milky Way, ib. and Nebulae, 213—215. supposes the sun to be in the Milky Way, 216. illustrates this opinion, 217—219. and gauges the Milky Way, 220. his theory of the heavens, 221—229. reflections, 230, 231. his thoughts on the antiquity of our nebula, 232. of nebulous strata, 233—242. The Dr's remark, 243. an objection, 244. answered, ib. 245. He proposes to ascertain the parallax of the stars, 539.

HERSCHEL, the new planet so named by foreign astronomers, 69. See GEORGIIUM SIDUS. Is seldom seen without a telescope, 79.

HESIOD mentions some of the constellations, 24.

HESSE. See WILLIAM IV.

HEVELIUS observes a comet, 45. and the spots and phases of the moon, 53. his books and apparatus burnt, ib. observed a new star, 88. his account of the sun's spots, 100. his opinion of comets, 183. his enumeration of stars in the constellations, 548, 550.

HINDOOS early astronomers, 12.

HIPPARCHUS used armillary spheres, 29. his astronomical discoveries and improvements, 31. observed a new star, 85.

HOMER, some of the constellations mentioned by, 24.

HONG-TI, emperor of China, his astronomical discoveries, 10.

HOOKE, Dr, invents instruments with telescopic sights, 54. disputes with Hevelius, ib. attempts to ascertain the parallax of the stars, 539.

HORIZONTAL PARALLAX, defined, 522. how to find it, 523.

HORIZONTAL SUN and MOON, apparent magnitude of the, 490. accounted for by Alhazen, 491. Des Cartes and Wallis, 492, 493. Dr Disaguiers, 494, and Dr Smith, 495. probable cause, 496.

HORROX, Mr, his discoveries, 52. observes the first transit of Venus, ib. 537.

HORSLEY, Dr, his estimate of the force of the moon, 471.

HUENNA, Tycho Brahe builds an observatory on, 48.

HUTTON, Dr, his computation of the earth's mean density, 68.

HUYGENS improves the telescope, 55.

J. I.

JANSON, W. a new star seen by, 87.

JAPANESE, early acquainted with astronomy, 12.

IMPROVED celestial globe, described, 677, 678.

INCLINATIONS of the planets to the ecliptic, 271.

INDIANS, early astronomers, 14, 15. accuracy of their calculations, 16. their system better than Ptolemy's, ib.

INFERIOR PLANETS defined, 354.

INSTRUMENTS described, 682—714.

JOHN of Halifax. See SACRO BOSCO.

JONES's Planetarium described, 675, 676.

JOSEPHUS, his account of the astronomical pillars, 5. his reason for the length of the antediluvian lives, ib.

ITALY, great astronomers in, 64.

JULIAN YEAR, excess of the, above the solar, 430.

JULY, reason why it is hotter than June, 426.

JUPITER, conjunction of, with Saturn, observed, 48. occultation of, by the Moon, 54. eclipses of, by his satellites, observed, 55. his appearance to the eye, 79. and through a telescope, 109. number of his belts variable, ib. 267. spots observed on him, ib. his figure and rotation, 110. has four satellites, 111. account of their phenomena, ib.—118. periodic times and distances, 112. apparent motions, 113. occultations, 114. variable appearances, 115. and eclipses, 116—118. other phenomena, 264, 267, 270, 271, 272. attractive power of Jupiter, 301, 302. motion of light from Jupiter to the earth, 396. his satellites often eclipsed, 664.

K.

KEILL, Mr, improves astronomy, 57. his opinion of the bright spots on the moon's disk, 160.

KEMPFER, his account of Chinese astronomy, 8.

KEPLER, invited to Prague, by Tycho Brahe, 49. succeeds him, ib. publishes Tables, ib. his discoveries, ib. his absurd opinions of comets and planets, 176. discovers, however, the paths of comets, 179. his method of calculating the periodical returns of comets, 196. discovers the laws of the planetary

A a a a

etary

saturn motions, 282. conjectures the true cause of the tides, 448.
 KEPLER'S LAWS, 283—285. illustrated, 284—289.
 KIRCH, M. G. observed a new star, 29.

L.

LANDE, M. DE LA, his theory of the tails of comets, 190. objects to Dr Halley's prediction, 200. and commends Clairault's work, 201.

LAVERGNE of a planet defined, 151. of a place, direction for finding the, 552.

LAWS of planetary motion, 283—285. 284—289.

LEWIS XV sends out two astronomers of chronometers to measure two degrees of the meridian, 61.

LIGHT, progressive motion of, discovered, 393. 395. proportions of, in the planets, 279. velocity and aberration of, 366—403. afford evidence of the motion of the earth, 399. 409—411. illustrated, 412—414. quantity of, afforded by the earth to the moon, 435. refraction of, by the atmosphere, 497—501.

LIMBS, ecliptical, defined, 183. rules for finding them, 198—199.

LINE, a meridian, rules for drawing, 304—307.

LOCAL MOTION, described, 355.

LOBBON BRIDGE, time of the tides arriving at, from the German Ocean, 478.

LONG, DR, his opinion of the solar spots, 244. 245. and of the lunar, 160. his arguments for a lunar atmosphere, 163.

LONGITUDE, method of finding the, proposed by Werner, 21. by Dr Halley, 60. executed, ib. Longitude of a celestial phenomenon defined, 357. of places, easily found in the moon, 418. eclipses useful in determining it, 684. 684.

LONGOMONTANUS collects the works of T. Brabe, &c. 48. COORDINATES of the planets described, 375—377. 403.

LUNAR ECLIPSES, two happen annually, 601. one visible, the other may be, Rules for calculating, 610—618. exemplified, 616.

LUNAR TABLES completed, 61. show the moon's place true in the syzygy, 627. 628.

LUNAR ANG, appearances of the earth to them, 425. 436. 442.

have always equal day and night, 437. their other probable peculiarities, ib.—439.

LUNATIONS, no complete number of, finished without a fraction, 380. See MOON.

M.

MACHINERY described, 666—681.

MAGNITUDE of the sun, defined, 97. MAGNITUDES of the celestial bodies, rules for calculating, 348—349. of the stars distinguished, 342.

MARIAN, his theory of the tails of comets, 190.

MARS, his appearance to the eye, 78. colour and other phenomena, ib. appearance through a telescope, 108. he has an atmosphere, ib. Dr Herschel's observations on his proportions, &c. ib. appears gibbous, near the quadratures, 264. rules for calculating his distances, 313. 328.

MARSHALL, the phenomenon early used at, 28.

MASKELYNE, Dr N. his astronomical observations, 66. recommends the lunar method of finding the longitude, 67. and proposes a nautical almanack, ib. which he has since annually executed, ib. goes to Scotland to try the effect of a high mountain on the plumb-line, 68.

MATTER, universal attraction of, proved, 68. 292. 323—344. density of, in the earth, 68. 292. and planets, 345. quantity of, in the superior planets, 343.

MAURERUS, M. and others sent to Lapland to measure the earth, 61. his opinion of the mutations of fixed stars, 207.

MAYER, M. his reward for his lunar tables, 61.

MEAN DISTANCES of the planets, 370.

MEDITERRANEAN SEA has no tides, 480.

MERCURY, appearance of, to the eye, 76. and through a telescope, 107. has phases similar to those of the moon, ib. 264. seen in conjunction with the sun, 364. and passing over his disk, 365. when he will be thus seen again, ib. his motion unequal, 364.

MERIDIAN, rules for finding the, 308. 713.

MERIDIAN LINE, rules for drawing, 304. 307.

METACALCULUS proposed to make telescopes of reflectors instead of mixers, 551.

METON, inventor of the cycle, 26.

MEXICANS, acquainted with astronomy, 12. their division of time, 12.

MICHELLE, his method to determine the distance, magnitudes &c. of the fixed stars, 200.

MICROMETER improved, &c. necessary for measuring angular distances, 685.

MILKY WAY, appearance of, 90. Dr Herschel discovers a considerable multitude of stars in it, 212. he views it by itself, ib. and supposes the sun to be in it, 236. he gauges it, 230.

MINUTE, synodical and periodical, defined, 363.

MOON, acceleration of the, determined by Ebo Fom's observations, 35. discovered by Dr Halley, 60. her appearance to the eye, 72. and through a telescope, 104. 105. number and names of her principal spots, 109. great inequality on her surface, 116. supposed to be mountains, ib. attempts made to measure their heights, 117. Dr Herschel's observations, similarity between them and terrestrial mountains, 117. conjectures respecting her moon's substance, 119. of her spots, 120. conversations about her having an atmosphere, 163—169. arguments for the negative, 161. and for the affirmative, 169—170. a luminous ring around her, a total eclipse, 166. experiments respecting it, 167. marks, 168. 169. inquiry whether the moon is inhabited, 170. is it really possible that she is, ib. her interior rough and uneven, 184. is supposed to have under clouds, rain, or water, &c. less than any primary planet, ib. her orbit and motion, 170. illustrated, 102—124. her conjunctions, 125—129. and peculiar phenomena, 144—147. is opaque, 431. not spherical, 430. her various phases, ib.—441. position of her culms, 442. her probability of being a planet, 443—446. her surfaces, 447. the influence of tides, 448—450. proposed of her force to that of the sun moving the sea, 451. her appearance at the full, 450—451. causes of the, 451—453. appearance near the horizon, 454.

INDEX.

INDEX, a signed figure of, 414. of to find the motions of her co, for calculation, 628—629.

INDEX, a signed figure of, 414. of to find the motions of her co, for calculation, 628—629.

INDEX, a signed figure of, 414. of to find the motions of her co, for calculation, 628—629.

INDEX, a signed figure of, 414. of to find the motions of her co, for calculation, 628—629.

INDEX, a signed figure of, 414. of to find the motions of her co, for calculation, 628—629.

INDEX, a signed figure of, 414. of to find the motions of her co, for calculation, 628—629.

INDEX, a signed figure of, 414. of to find the motions of her co, for calculation, 628—629.

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INDEX, a signed figure of, 414. of to find the motions of her co, for calculation, 628—629.

INDEX, a signed figure of, 414. of to find the motions of her co, for calculation, 628—629.

INDEX, a signed figure of, 414. of to find the motions of her co, for calculation, 628—629.

INDEX, a signed figure of, 414. of to find the motions of her co, for calculation, 628—629.

INDEX, a signed figure of, 414. of to find the motions of her co, for calculation, 628—629.

INDEX, a signed figure of, 414. of to find the motions of her co, for calculation, 628—629.

INDEX, a signed figure of, 414. of to find the motions of her co, for calculation, 628—629.

- rizon, 490. various reasons assigned for it, *ib.*—496. inequalities of her motions, 564. how to find her diurnal and horary motions, &c. 567—569. causes of her eclipses, 570—582. rules for calculating them, 584—628. to find her way from the sun, 629—634. her colour, &c. during an eclipse, 658, 659. her distance from the earth less than formerly, 662. her various phases exemplified, 672—674, 676.
- MORNING STAR**, 77.
- MOTION**, planetary, laws of, 283—285, 363—385. of light, 395—402.
- MOTIONS** of comets, 327—331. of planets in antecedence and consequence, defined, 355. direct, 363, 378. and retrograde, 363, 379. progressive of light, 409, 410. annual and diurnal of the earth, 411—414, 511.
- MULLER**, John, completes Ptolemy's almagest, 40. his improvements in astronomy, *ib.*
- MURAL QUADRANT**, described, 687—693.
- N**
- NAIL** in a chariot wheel, the motions of the earth and moon illustrated by the, 446.
- NAPIER** of Merchiston, his discoveries, 50.
- NAVIGATORS**, several, have sailed round the globe, 388.
- NAUTICAL ALMANACK** annually published, 67.
- NAUTICAL EPHEMERIS** published, 63.
- NEAP TIDES**, cause of the, 453, 470, 474.
- NEBULÆ** explained, 137. vast numbers of, discovered by Dr Herschel, *ib.* his account of them, 214—233. See **HERSCHEL**.
- NEW STARS**, account of several, 84—89.
- NEWTON**, Sir Isaac, constructs reflectors with spherical speculums, 56. brings speculative astronomy to perfection, 57. determines the figure of the earth, 61. discovers the true motion of comets, 180. is of opinion that they are opaque bodies, 183. and that their tails are a thin vapour, expelled by the heat, 189. has demonstrated, that a cubic inch of air, properly rarefied, would fill the whole planetary regions, up to Saturn, *ib.* his estimate of the heat of comets, 194. he confirms the Copernican system, 259. lays down the laws of motion, *ib.* and gravity, 275, 281. his argument against the eternity of the world, 299. his method of finding the parabola of a comet, 329, and the form of its orbit, 330, 331. his theory of the tides, 448.
- NICERAS** maintained the motion of the earth, 257.
- NOAH**, said to have taught his descendants astronomy, 8.
- NODE**, ASCENDING, place of the, 271. definition and mark of it, 354.
- NODE**, DESCENDING, definition and mark of the, 354.
- NODES** defined, 260. how to find the motion of the moon's, 323, 324. line of the nodes, defined, 354.
- NONAGESIMAL** degree defined, 443.
- NONIUS** improves astronomy, 44.
- NORTH POLE STAR**, appearance of the, 73, 74.
- NUMBER** of the constellations, 545. of stars in each, 548—550.
- O**
- OBLIQUITY** of the ecliptic, 553.
- OBSERVATORIES**, the towers of Babel and Belus supposed to be, 19. the pyramids of Egypt probably used as such, *ib.*
- OBSERVATORY** described, 682. the portable, description of, 704—714.
- OCCULTATION** of Jupiter, by the moon, observed, 54.
- OCTANTS** of the moon described, 448.
- OPPOSITION** defined, 359. mark of, 360.
- ORBITS** of the planets, inclinations of the, to the ecliptic, 271. described, 282—298, of the secondary planets, 320—326. their excentricities, 560, 561.
- ORION**, number of stars in, 136.
- ORRERY** erected by Archimedes, 30. description of the grand, made for king George I. 666. of Mr Ferguson's, 669—674.
- OSIANDER** assists in publishing Copernicus's work, 43.
- OSYMANDYAS**, an astronomical circle in the monument of, 19.
- ORTH**, Valentine, completes Rheticus's work, 46.
- P**
- PACIFIC OCEAN**, tides greater in, than in the Atlantic, 477.
- PARABOLA** of a comet, method of finding the, 329.
- PARALLAX**, of the superior planets, 272. definition of a, 522. rules for finding it, 523—533. and those of the sun, 536. and fixed stars, 539—541.
- PATHS**, apparent, of the planets, 374, 375.
- PELUSIUM**, the birth place of Ptolemy, 32.
- PENDULUM**, a test of velocity, 304. cause of its vibration, 333. vibrates quickest near the poles, 405.
- PENDULUM CLOCK** described, 683.
- PENUMBRA**, rule to find the place touched by the, 656.
- PERIGEE** defined, 372, 381.
- PERIOD** of eclipses, 580. when discovered, 581. of the moon, shorter than formerly, 662.
- PERIODICAL** revolutions, 270, and times of the planets, 559.
- PERSIA**, antiquity of astronomy in, 14.
- PHILOLAUS**, a Pythagorean astronomer, 26.
- PHOENICIANS** applied astronomy to navigation, 23.
- PISCES** and Aries, appearances of the moon in, 483—488.
- PLACE**, M. DE LA, his opinion of the cause of the moon's period being accelerated, 662.
- PLACES** of the ascending nodes of the planets, 271. and of the aphelion, 272.
- PLANETARIUM**, erected by Archimedes, 30. Mr Jones's described, 675.
- PLANETS**, a theory of the, wrote by Muller, 40. their appearances to the eye, 75—80. number, 75. apparent magnitudes, 80. and motions, *ib.* Supposed by Kepler to be huge animals, who swim round the sun by means of fins! 176. Planets disturb the motions of comets, 202. Their names and order, 260. are all opaque bodies, 263. and spherical, 265. their periods, distances and excentricities, 270. diameters, rotations, inclinations of orbits, and place of ascending node, 271. greatest elongations, proportions of light, heat, bulk, and density, and places of aphelion, 272. orbits and motions of primary, 282—299. and secondary planets, 300—326. their circles defined and described, 347—352, 355. their latitude, 353—356. and longitude, 357. conjunctions, oppositions, and aspects, 359—368. stationary appearances, 369—373. apparent paths, 374, 375. motions, 376, 377. direct, 378. and retrograde, 379. in apogee and pe-

PLINIA, his opinion of comets, 174. and prediction concerning them, *ib.*

PLINY's globes, the stars distinguished upon, 545.

PLATON, said to have taught the Egyptians astronomy, 22.

PLATO acquainted with astronomy, 5. Josephus's account of his pillars, *ib.*

PLANET, definition and marks of, 360.

SHADOW of the earth always round, 388.

SHIPS, at sea, afford evidence that the earth is round, 387.

SHORT, Mr, improves astronomical instruments, 58.

STRABO, early astronomers, 12, 15.

SIDERAL DAYS, defined, 509.

SIDERAL YEAR, defined, 427.

SIGNS, Chinese names of the, 8. defined, 355.

SMITH, Dr. his reason for the apparent magnitude of the horizontal moon, 495.

SNELLIUS publishes astronomical works, 41.

SOLAR DAYS, defined, 509.

SOLAR ECLIPSES, of the shadow and penumbra in, 591—597. when they can happen, 599. number of, in a year, 602. rules for calculating, 635—657.

SOLAR NOON, variation of the, from the clock, 521.

SOLAR SYSTEMS, space universally filled with, 205. each supposed to have its own period of creation, duration, and final consummation, *ib.*

SOLAR YEAR, difference between the, and the Julian, 430.

SOUTHERN CONSTELLATIONS, 549. number of stars in each, *ib.*

SPHEROID, AN OBLATE, the earth found to be, 61.

SPOTS. See **SUN** and **MOON**.

SPRING TIDES, causes of the, 453, 470, 474.

STARS, FIXED, catalogues of the, made by Hipparchus, 31. Ulug Beg, 36. William IV. of Hesse, 47. Tycho Brahe, 48. Dr Flamsteed, 59. Dr Halléy, 60. and Dr Herschel, 69. their aberration discovered, 57. appearances to the eye, 73—75. most numerous in the northern part of the heavens, 73. liable to changes, 83. their appearances through telescopes, 135—137, which do not magnify their sizes, 135. but greatly increase their numbers, 136. supposed to be suns, 203. and

each attended with planets, or inhabited worlds, *ib.* objection, 204. answered, *ib.* 205. the disappearance of some stars, and appearance of new ones, urged as an argument against the eternity of the world, 205. accounted for, however, on other principles, 206. M. Maupertuis's opinion, 207. Mr Dun's conjecture, 208. M. Michel's plan, 209. Dr Herschel's theory, 210, 211, and observations of innumerable multitudes of stars, 212—242. his inferences, 243. apparent changes of stars, 246. are situated at an immense distance, 261. shine by their own light, *ib.* no method found to ascertain their distance, 538. conjecture as to it, 539. Dr Herschel's method, 540. still insufficient, 541. divisions of the stars, 542—550. number of in the constellations, 548—550. how to find their right ascension, 556, 557. longitude and latitude, 558.

STARS, NEW, Dr Halley's account of several, 84—89.

STARS, UNFORMED, defined, 543. constellations made out of them, 550.

STATIONARY conditions of the planets defined, 363. described, 367—370. explained, 371.

STYLE, reason for the change of, 430, 431.

SUN, spots on the, discovered, 51. his parallax and distance computed, 65. his appearance to the eye, 71. and through a telescope, 92—103. his spots observed by Galileo, Scheiner, and Harriot, about the same time, *ib.* 93. variety and dimensions of them, 94. subject to increase and diminution, 95. of various and mutable forms, and number, *ib.* 96, 97. their velocity, 98. and uniform motion, from E. to W. *ib.* other phenomena respecting them, 99—103. Dr Long's account of them, 144, 145. how to find the time of their revolutions, 146, 147. different opinions concerning them, 148. Dr Wilson's, 149—154. an experiment proposed, 155. the sun supposed to be not in the centre of the universe, 216. but in the Milky Way, *ib.* is at an immense distance, 262, of vast magnitude, *ib.* and of a globular form, *ib.* mutual gravi-

tation between the sun and primary planets, 289—297. action of the sun upon the secondary planets, 300—326. proportion of his action on both, 335—344. his conjunctions with the planets, 359—385. is immensely larger than the earth, 391, 392. proofs that the earth moves round the sun, 393—414. and that the sun moves round his axis, 403, 404. he is higher in summer than in winter, 422. and more distant, 424. reasons of his superior heat, *ib.*—426. periods of his completing a tropical and sidereal year, 427. appears to fall back with regard to the stars, 428. reasons for his magnitude near the horizon, 490—496. the motion of the sun illustrated, by supposing a fictitious sun to move equally, 513—521. the sun's parallax, the most important problem in astronomy, 536. how to find the sun's declination, 555. and the moon's way from the sun, 629—634. to calculate eclipses of the sun, 635—637.

SUPERIOR PLANETS, defined, 354.

SURFACE of the moon rough, 468.

SWEDEN, eminent astronomers in, 64.

SYNOPSIS of the sun and planets, 269—272.

SYSTEMS of astronomy, account of the most famous, 248—281. of the Pythagorean, 250. Ptolemaean, 251—253. Tychonic, 254. Semi-Tychonic, 255. Cartesian, 256. and Copernican, 257—281.

T.

TABLES, astronomical, published, 38, 49, 60, 63, 551. how to construct, 563.

TAILS of comets, various theories respecting, 188—193. One comet has sometimes several tails, 192. They are probably streams of electric matter, 193.

TATIUS, Achilles, his account of the invention of astronomy, 14.

TCHOU-CONG, a famous Chinese astronomer, 11.

TELESCOPES, improvement of, 54—59. various kinds of, 684, 690, 700, 704. how to point, 714.

TELESCOPIC STARS defined, 542.

THALES,

ASTRONOMY.

- 448**
THALES, an improver of the Grecian astronomy, 24.
THAMES, phenomenon of the tides in the, 478.
THIRTEEN, a favourite number among the Mexicans, 18.
TIME, theory of the, 448—481; causes of the spring and neap, 453; 470—473; 474. tides supposed, in the atmosphere, 481.
TIME, rules for finding, 508—511, and equation of, 512. illustrated, 513—516. and explained, 517—521.
TIME-KALPASA, recommended by Prilius, to determine the longitude, 46.
TIME, periodical, of the planets, rule to find the, 539.
TOULMIN, Dr. arguments against his doctrine of the eternity of the world, 204, 205, 209.
TRAJECTORIUM LUNARE, described, 679—681.
TRANSIT INSTRUMENT, described, 700—703.
TRIANGLE, a triangle wrote on, by Purbach, 40.
TRIENOMETER improved by Arzachel, 35.
TRINE ASPECT, definition and mark of a, 360.
TROPEIC of Cancer described, 417, of Capricorn, 419.
TROPICAL YEAR, defined, 427.
TWILIGHT, cause of the, 500, 501.
TYCHO. See BRAHE.
TYCHONIC SYSTEM, account of the, 354.
U. V.
VELOCITY of the spots on the sun, 98, of comets greatest in their perihelion, 181. of bodies, phenomena of the, 278, 303, 304. of the earth, 386. of light, 396.
VENUS, the first transit of, ever observed, 54. the 1d and 3d observed in various places, 65; inferences, ib. her appearance to the eye, 77. and through a telescope, 109. her phases and changes similar to those of the moon, ib. were first observed by Galileo, ib. Dr Herschel's observations and inferences, ib. she has an atmosphere and is larger than the earth, ib. periods of her transits, 365. her apparent paths, 374. and motions, 383, 385. rules for calculating her parallax, 533, 534, 535, 536. advantage of observing her transits, 536. history of them, 537. Venus's path traced, 538.
VARNIAE, P. inventor of the vernier, 691.
VERNIER described, 691, 692.
VIBRATION of pendulums, cause of the, 313.
VISIBLE ECLIPSES, number of, in the year, 603.
VIRESCOLO, a writer in Optics, 38.
VITRUVIUS, his account of the Grecian astronomy, 28.
ULLOA, G. J. and A. 28, accompany Mess. Condarnue, &c. on the southern expedition, 61.
ULUG BEG, prince of the Tartars, an eminent astronomer, 36. composes astronomical tables, ib. and makes a catalogue of the stars, ib.
UMBRA on the sun defined, 100, 101.
UNIFORMED STARS defined, 543.
UNIVERSAL, Dr Herschel's theory of the, 227—245.
VOLCANOS in the Moon, 158.
URANIBURG, built by Tycho Brahe, 48.
URANOMETRIA, a work published by Bayer, 50.
URSA, major and minor, number of stars in, 548.
W.
WALLIS, his reason for the apparent magnitude of the horizontal sun and moon, 492; objection, 493.
WALTHAM, Edward, continues Muller's observations 41.
WATCH-WORK improved by Graham, 60.
WEBER, John, observes a comet, 42. writes astronomical tracts, ib. and proposes a method of finding the longitude, ib.
WHISTON, Mr. ascribes the deluge to the approach of a comet, 195. his theory of the event, ib. supposes the probability of the sun's nearest approach of the time connect to the globe, ib.
WILLIAM IV. Landgrave of Hesse, improves astronomy, 44, 47.
WILSON, Dr. his account of the spots on the sun, 103. his opinion respecting them, 104. his objection, 151 answered, his opinion confirmed, his conclusion, 154. proposes an experiment, 155.
WINTER, the sun nearest the earth in, 424. seasons when it is then coldest, ib.—426.
WOLLASTON, Mr. his remarks on the sun's spots, 121.
WRIGHT, Mr. his astronomical discoveries, 50.
X.
XIPHIAE, number of stars in, 549.
Y.
YEAR, the grand, Josephus's account of, 5. Cassini's remark on, & the tropical and sidereal defined, 417. Civil and sidereal distinguished, 419. the difference, ib. 430. rectified by the change of the stile, 434.
YOUNG, Edm. contributes to determine the moon's acceleration, 35.
Z.
ZACH, Dr. his account of the Harriot's discovery of the spots on the sun, 93.
ZANOTTI, an eminent astronomer, 64.
ZENITH SECTOR invented by Graham, 64.
ZODIAC, Chinese division of, & etymology and definition, 349. division of, 355. all local, defined, ib. exact, 346.
ZODIACAL LIGHT, discovered by Cassini, 140. defined and described, ib. 241—244.
ZONES, or belts, round Jupiter, discovered by Cassini.
ZOROASTER, an early astronomer, 19.

